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**SPATIAL STUDIES IN TRANSPORTATION: Introduction and
Annotated Bibliography**

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SPATIAL STUDIES OF TRANSPORTATION:
INTRODUCTION AND ANNOTATED BIBLIOGRAPHY

by

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PREFACE

This bibliography has grown out of the author's research and his teaching of undergraduate and graduate courses over the last several years in the geography of transportation. The need was felt for a bibliography on a subject with a diverse and widely scattered literature. The annotations were developed not only to aid the beginning student with the field but also to guide the advanced graduate student to specific topics and approaches. The bibliography is limited to references in English and basically covers the last ten years. No claim of completeness is intended, although the aim has been to survey the essential literature.

Many individuals have assisted in the completion of this bibliography. Those deserving special thanks include Messrs. George Anderson, James Nance, John D. Stephens, and Mark Sullivan, all graduate students in geography at Michigan State University. Their long hours spent in the library have greatly aided in giving this bibliography whatever accuracy and usefulness it may have. However, the author retains full responsibility for any errors and omissions, and it is hoped that these will be called to his attention for future correction.

Finally, the author especially wishes to thank his wife, Sharon, for careful checking of detail and for typing both rough drafts and the final copy.

James O. Wheeler

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I. INTRODUCTION TO BIBLIOGRAPHY

This bibliography covers the essential literature in English over the last decade on spatial studies of transportation. It has of course proven impossible to include all of the references relevant to transportation geography or even expressly a part of the field in a volume of restricted length. However, an attempt is made to survey the more significant books and articles of interest to the student of transportation geography. More obscure material, found in discussion papers or in mimeographed form, are generally not included. Nor are doctoral dissertations or master theses.

The bibliography is designed to aid researchers in the general field of transportation, and more specifically in the spatial analysis of transportation, to readily locate material dealing with their particular interest. The abstracts are intended to point up salient features of the books or articles not always evident in the title. The bibliography also gives some indication of the amount of research done on particular subjects, as well as the current findings and understanding of the various topics. Further, a close examination of the bibliography should suggest additional research areas. For example, some of the theoretical studies may suggest further theoretical development or alternatively may prove useful for more practical planning or policy oriented research.

A second and related purpose of the bibliography is for the college and university student interested in transportation as a spatial science, including the role of transportation in locational theories. Careful study of the bibliography should place the student in touch with a wide range of useful transportation geography literature. By reference to the classification system used here, the student may direct his readings around specific kinds of topics and concepts. The bibliography then should assist one in developing a knowledge of part or all of the field. Likewise, a student indirectly interested in transportation may skim the entries for books and articles useful a particular research project or for independent study. In short, the bibliography may be used as a reference book or as a guide to developing a competence in understanding the spatial components of transportation.

It is hoped that this volume will be useful not only to academic researchers, instructors, and students, but also will be used by those more interested in policy and planning aspects of transportation. Accordingly, some focus is given to books and articles treating the spatial role in transportation planning and policy formulation. As is well-known, transportation planning directly involves the location of routes, their use, and their impact. An up-to-date knowledge of the literature in these areas is therefore fundamental, and it is anticipated that this publication would be of considerable utility to those involved in planning and executing transportation change. In this regard, a large number of articles are included from the Highway Research Record and Highway Research Bulletin.

The urban scholar will also find much of interest here, as a high proportion of the studies are of various facets of urban transportation. These studies range from general introductory statements of the status and problems of transportation in the city to more narrowly focused treatment of individual problems and individual urban areas. Research in urban transportation has been carried out by a great variety of scholars representing numerous disciplines; entries in this bibliography reflect this wide range of viewpoints and approaches.

Although many of the studies here are properly classified as descriptive, a certain bias towards research emphasizing a theoretical content and approach may be noted. It is felt that these studies are of more general interest to a wider audience and are more useful as a base on which to build future research. It is hoped that greater concern will be placed in the future on more theoretical and conceptual types of investigations, especially in areas in which such an approach has been rare in the past.

Entitled "Spatial Studies of Transportation," this bibliography goes well beyond the disciplinary boundary of geography in including a variety of material on the spatial studies of transportation. A minority of the entries are by those trained as geographers. Also prominently represented is research by regional scientists, economists, planners, transportation engineers, and sociologists, to name only a few. The bibliography is interdisciplinary because the research on spatial transportation is approached by a variety of disciplinary viewpoints. However, there was an effort made to include most of the significant articles from the geographical periodical literature in the past decade.

As indicated, the emphasis here is on the literature from the 1960's, and generally only the most important or prominent studies prior to 1960 have been included. Studies of migration have in general not been included here, nor have studies in diffusion processes (See Gunnar Olsson, Distant and Human Interaction, Philadelphia: Regional Science Research Institute, Bibliography Series No. 2, 1965 and Lawrence A. Brown, Diffusion Processes and Location: A Conceptual Framework and Bibliography, Philadelphia, Pennsylvania: Regional Science Research Institute, Bibliography Series No. 4, 1968). Selected studies focusing on transportation and industrial location are referenced, but a much more inclusive source is Benjamin H. Stevens and Carolyn A. Brackett, Industrial Location: A Review and Annotated Bibliography of Theoretical, Empirical and Case Studies, Philadelphia: Regional Science Research Institute, Bibliography Series No. 3, 1967.

This bibliography differs from other available reference sources in coverage, purpose, and scope. It might be regarded as a complement to an older annotated bibliography: R. Wolfe and B. Hickok, An Annotated Bibliography of the Geography of Transportation, Berkeley: Institute of Transportation and Traffic Engineering, University of California, 1961. A publication by William R. Siddall, Transportation Geography: A Bibliography, Manhattan: Kansas State University Library, 1969, contains many references going back to 1950, emphasizing modes of transportation and a

regional classification wherever possible. Many references on general and historical studies in transportation are included, with relatively few references to theoretical approaches and urban studies, especially outside the field of geography. A bibliography emphasizing theoretical and urban research is William R. Black and Frank E. Horton, A Bibliography of Selected Research on Networks and Urban Transportation Relevant to Current Transportation Geography Research, Evanston: Northwestern University, Department of Geography Research Report No. 28, undated. An additional source complementing Siddall's and "providing a base of general works in transportation geography" is Russell B. Adams and Mark C. Geyer, Transportation: A Geographical Bibliography, Minneapolis: University of Minnesota, Department of Geography, 1970. A monthly publication referencing a wide spectrum of literature is Current Literature in Traffic and Transportation, Evanston: Northwestern University, The Transportation Center. Other useful references on specialized topics Sources of Information in Transportation, Evanston: Northwestern University, The Transportation Center, 1964; Katherine D. Warden, "Selected Bibliography: Transportation and Economic Development," in G. Fromm, editor, Transport Investment and Economic Development, Washington, D.C.: Brookings Institution, 1965, pp. 277-305; and James O. Wheeler, Research on the Journey to Work: Introduction and Bibliography, Monticello, Illinois: Council of Planning Librarians, No. 65, 1969.

II. TRANSPORTATION GEOGRAPHY

Transportation geography is a field with a rapidly expanding literature and growing prominence, having emerged a mere fifteen to twenty years ago as a visible subfield of geography. Based largely on the methodological statements of Ullman (884, 885) in the mid-fifties and carried into the sixties by Garrison's powerful influence, the field has had especially vigorous development during the last decade. Although the development has been uneven, due in part to the role of individual researchers, the field has taken on a skeletal form and organization which is attracting an increasing number of students and researchers. The field is sufficiently defined to suggest a considerable potential for further growth founded on the existing research base.

Transportation geography is defined here as the study of the interactions among locations on the earth as manifest by connections and movements. The field may be divided for convenience of discussion into three broad and overlapping areas, in each of which the primary focus may be on transportation patterns or on processes. The first research cluster examines the routes or connections among places, emphasizing the location, structure, and evolution of routes or networks. The research interest here is normally at a macroscale, rather than at the scale used by the transportation engineer in fixing exact routing. These studies range from the highly morphologic to those focusing on the processes generating network development. Both theoretical conceptualizations and empirical analyses have been followed.

A second research core seeks to understand the areal variation in movement among locations. A number of interaction of flow models are employed to describe such flow variability. A considerable literature in urban and transportation planning has concentrated on the development and testing of models of movement. Also into this second research category fall the numerous studies, especially of the past, which treat the extent of hinterlands or urban trade areas using interaction data. Only a sampling of these studies is included here, and a more complete source is Brian J.L. Berry and Allan Pred (61). Both the study of networks and movement on networks has given emphasis to the analysis of patterns, rather than to the processes operating through time which alter transportation patterns.

The third area of spatial research on transportation is impact analysis, in which the effects of networks and movements are considered on land use, activity nodes, and behavior. Here the studies are commonly process-oriented in that changes in transportation are recognized to be interdependent with change in nontransport features of the area. A most considerable literature exists here, where the boundary lines between transportation and other areas of geography become indistinct. In some such studies, transportation is regarded as one of a series of independent variables inducing change or explaining a portion of the areal variations in some variable.

These three research clusters describe the field abstractly in terms of kinds of relationships rather than by kinds of transport nodes or by regions on the earth. This three-fold division is appropriate whether at the scale of a small city or that of a continent. Because of the concentration of movement within cities, there are a large number of studies dealing with urban transportation, and such studies in this bibliography are generally identified as having an urban focus, as well as noting whether they emphasize networks, flows, or impact.

Many of the articles in this bibliography can be conceptualized within the framework of Berry's "geographic matrix" (Brian J.L. Berry, "Approaches to Regional Analysis: A Synthesis," Annals, Association of American Geographers, Vol. 54, March 1964, pp. 2-11). Berry identifies five basic approaches to regional analysis: "One can examine:

- (a) the arrangement of cells within a row or part of a row; or
- (b) the arrangement of cells within a column or part of a column."

Since the rows of the matrix represent characteristics of places and the columns refer to places or locations, the first approach leads, in the context of transportation geography, to an analysis of the way in which transportation characteristics vary in magnitude and importance from place to place (depending on the scale of investigation). The second approach would identify the significance of transportation at a particular node and the relationship between transportation and other functions and attributes of that node, as in the study of port cities.

Instead of studying only a single column, one might undertake:

- "(c) comparison of pairs or of whole series of rows; and
- (d) comparison of pairs of columns or of whole series of columns."

These two approaches are simple extensions of the former two and involve the study of somewhat more complex relationships. The third approach (c) considers the spatial associations among different transport variables, such as accessibility and movement, or between transport and nontransport variables, such as movement cost and production economies of scale. This approach may also include comparative analysis of nodes or types of movement at a number of locations. The fourth approach (d) represents a comparative regional analysis of transportation in different parts of the world or at different locations.

Many empirical studies focus on a portion of the matrix, pointing up a fifth approach:

"(e) the study of a 'box' or submatrix."

As Berry indicates, this approach may "involve some or all of steps (a)-(d) above" and represent a case study method.

These five approaches may each be considered in the temporal dimension, allowing a total of ten ways to undertake research in the geography of transportation.

Many kinds of transportation data may be placed into matrix form to readily depict interaction among locations. In contrast to the geographic matrix described above, an interaction matrix consists of m rows for origins and n columns for destinations. The elements of the matrix may indicate whether or not a direct connection exists between origin i and destination j (adjacency matrix) or may represent the magnitude of flow between i and j . A large number of techniques exist for the analyses of such matrices (805).

A more complete review of the field of transportation geography may be found in James O. Wheeler, "An Overview of Research in Transportation Geography," The East Lakes Geographer, Vol. 7, 1971.

III. USER GUIDE

A. Organization

This bibliography classifies each article into at least one topic, as indicated by the topical guide. Frequently an entry is cross classified. A topical index is provided at the end. The classification system includes the traditional divisions by modes, but only where the study rather directly focuses on a mode. If appropriate, the study is placed into topics 5, 6, or 7 (networks, flows, and transport impact). The study may also be classified by approach, general, historical, or theoretical-conceptual, as well as by subject area (as with modes or urban research). A category termed "Transportation Data" points up data sources, data collection and display methods, and data uses in the field of spatial studies in transportation. It is felt that this organization will be of maximum benefit to the greatest number of users.

B. Topical Guide

1. General
2. Theoretical-Conceptual
 - a. General
 - b. Travel Models
3. Historical
4. Urban
5. Networks
 - a. Network Measures and Structure
 - b. Route Location
 - c. Route Evolution
6. Flows and Movement
 - a. International
 - b. Interregional
 - c. Intraurban
7. Impact of Transportation
 - a. Highway Effects
 - b. Economic and Regional Development
 - c. Ports
8. Modal Studies
 - a. Rail
 - b. Highway
 - c. Water
 - d. Air
 - e. Pipe
 - f. Other
9. Transportation Data

C. Periodical Abbreviations

The names and abbreviations of periodicals commonly appearing in this bibliography are given below.

AER	- American Economic Review
	- American Journal of Sociology
AAAG	- Annals, Association of American Geographers
	- Australian Geographer
	- Australian Geographical Studies
	- Business History Review
CG	- Canadian Geographer
	- East Lakes Geographer
	- East Midland Geographer
	- Economic Development and Cultural Change
EG	- Economic Geography
	- Ekistics
	- Environment and Planning
	- Fortune
	- Geografiska Annaler
GA	- Geographical Analysis
	- Geographical Journal
GR	- Geographical Review
G	- Geography
HSGTJ	- High Speed Ground Transportation Journal
HRBB	- Highway Research Board Bulletin
HRR	- Highway Research Record
ITJ	- Institute of Transport Journal
	- Journal of Air Law and Commerce
	- Journal of American Institute of Planners
JG	- Journal of Geography
	- Journal of Industrial Economics
	- Journal of Political Economy
JRS	- Journal of Regional Science
JTEP	- Journal of Transport Economics and Policy
JTH	- Journal of Transport History
	- Journal of Tropical Geography
	- Journal of the Institute of Highway Engineers
	- Journal of the Institute of Mathematical Applications
LE	- Land Economics
	- Monthly Labor Review
	- New Zealand Geographer
FRSA	- Papers of the Regional Science Association
	- Proceedings, Association of American Geographers
PG	- Professional Geographer
	- Scientific American
	- Scottish Geographical Magazine
	- Social Forces
SGRT	- Soviet Geography: Review and Translation
TESG	- Tijdschrift voor Economische en Sociale Geografie
TPR	- Town Planning Review

- TE - Traffic Engineering
- TQ - Traffic Quarterly
- Transactions: Institute of British Geographers
- Transport and Communications Review
- Transportation Journal
- Transportation Research
- TS - Transportation Science
- Urban Affairs Quarterly
- US - Urban Studies
- Yearbook of the Association of Pacific Coast Geographers

IV. BIBLIOGRAPHYA. Annotated Bibliography

1. Adams, John S. "Directional Bias in Intra-Urban Migration," EG, Vol. 45, October 1969, pp. 302-323. (2,4).
2. Adams, Russell B. "U. S. Metropolitan Migration: Dimensions and Predictability," PROCEEDINGS, A. A. G., Vol. 1, 1969, pp. 1-6. (2,4).
3. Alagoma, Dagago. "Transport in Africa in Relation to Economic Development," ITJ, Vol. 31, January 1965, pp. 53-56. (7b).

Treats the problems of economic nationalism in African development.

4. Albrink, Karl S. and Joseph F. Cobbs. "Research into the Value of Landlocked Right-of-Way Parcels," HRR, No. 8, 1963, pp. 95-106. (7a).

Recommends appraisers and negotiators use case studies to aid in the establishment of a method that can be applied to determine land values.

5. Aldcroft, Derek H. "The Decontrol of British Shipping and Railways after the First World War," JTH, Vol. 5, November 1961, pp. 89-104. (3,8a,8c).

Outlines the reconstruction problems involved in decentralizing railway and shipping industries and compares the way in which the government dealt with decentralization from 1918 to 1921.

6. Aldcroft, Derek H. "The Eclipse of British Coastal Shipping, 1913-21," JTH, Vol. 6, May 1963, pp. 24-38. (3,8c).

7. Alexander, David and Leon N. Moses. "Competition Under Uneven Regulation," AER, Vol. 53, May 1963, pp. 466-473. (2a).

Presentation of a theoretical scheme to demonstrate how an increase in the regulated rate is equivalent to a reduction in the supply of regulated transport, as justification for the extension of agricultural exemption to rail and water carriers.

8. Alexander, John W. "Freight Rates as a Geographic Factor in Illinois," EG, Vol. 20, January 1944, pp. 25-30. (6,7).

Presents a series of maps showing the freight rate structure and the relationship of this structure to the location of grain and livestock production; concludes that the rate structure favors production of grain in the East and livestock in the West and Northwest.

9. Alexander, John W., and S. Earl Brown, and Richard Dahlberg. "Freight Rates: Selected Aspects of Uniform and Nodal Regions," EG, Vol. 34, January 1958, pp. 1-18. (6b).

Maps and describes the rate structure in Wisconsin.

10. Alexander, John W., and S. Earl Brown, and Richard Dahlberg. "International Trade: Selected Types of World Regions," EG, Vol. 36, April 1960, pp. 95-115. (6a).

Proposes seven classification systems for regionalizing data on international trade, giving the characteristics, evaluations, and usefulness of each.

11. Alexanderson, Gunnar and G. Norstrom. WORLD SHIPPING: AN ECONOMIC GEOGRAPHY OF PORTS AND SEABORNE TRADE. New York: John Wiley & Sons, Inc., 1964. (1,7c,8c).

A comprehensive treatment of world shipping, sea routes, and hinterlands, with systematic and regional chapters.

12. Alonso, William. "A Theory of the Urban Land Market," PRSA, Vol. 6, 1960, pp. 149-157. (2a).

Presents a non-mathematical overview of a theory of the urban land market, based on agricultural rent theory and involving trade-offs between rent and transport.

13. Andreassen, John C.L. "Canadian National Railway Records," BUSINESS HISTORY REVIEW, Vol. 39, 1965, pp. 115-119. (8a,9).

A progress report on the attempts to organize the records of the Canadian National Railways for greater research usefulness.

14. Andrews, J.A.C. "Urban Transportation in Canada," TE, Vol. 38, October 1967, pp. 58-61. (4).

A study of eleven Canadian cities showing the decline of transit despite population growth and giving recommendations for more investment in transport systems.

15. Appleton, J. H. "The Efficiency of the Great Australian Divide as a Barrier to Railway Communication," TRANS-ACTIONS: INSTITUTE OF BRITISH GEOGRAPHERS, No. 33, 1963, pp. 101-122. (5c).

The notion that the Great Australian Divide is an effective barrier to transportation is analyzed and qualified.

16. Appleton, J. H. A MORPHOLOGICAL APPROACH TO THE GEOGRAPHY OF TRANSPORT. Yorkshire, England: University of Hull, 1965. (2a).

The purpose of this study is to examine the part played by morphological studies in the geography of transportation. The reasons for transportation geography's nonmorphological trends in the past are examined and its implications for further studies in geography are considered. An attempt is made to put the morphological approach into perspective insofar as it is relevant to the geography of transportation.

17. Appleton, J. H. "Some Geographical Aspects of the Modernization of British Railways," G, Vol. 52, November 1967, pp. 357-363. (5b,5c,8a).

Presents a factual account of changes in network shape, utilization, and character and evaluates closure of certain lines, changes in ownerships, "Merry-go-round" systems, and proposed truck routes.

18. Appleyard, Donald, Kevin Lynch and John Myer. "The View from the Road," HRR, No. 2, 1963, pp. 21-30. (5b).

Discusses the landscape seen by the driver and passengers along highway routes, outlines objectives to provide the viewer with coherent form and a clarified image and meaning of the environment, and uses field data to suggest such findings may be employed in highway planning.

19. Arth, Maurice P. "Federal Transport Regulatory Policy," AER, Vol. 52, May 1962, pp. 416-425. (1).

Based on evaluation of the Weeks and Mueller reports, the Hector and Arpia protests, the Doyle study, and the Landis Report, steps are identified which should be taken to improve federal regulation of transportation. It is concluded that the greatest needs are for low-cost competitive pricing of carrier services and universal and adequate pricing for government-facility services.

20. Ashley, Roger H. and William F. Berard. "Interchange Development Along 180 Miles of I-94," HRR, No. 96, 1965, pp. 46-58. (2a,4,7a).

Analysis and classification of freeway interchanges as they relate to community development.

21. Ashton, Winifred D. THE THEORY OF ROAD TRAFFIC FLOW. London, England: Methuen & Co., Ltd., 1966. (2).

Comprehensive textbook on traffic flow theory written primarily for statisticians, applied mathematicians and engineers specializing in the traffic field. Although the approach is theoretical, the author contends that a number of the results collected still find practical application.

22. Aynvarg, Ye. S. "Zones of Influence of Middle-Size Cities, Their Boundaries and Passenger Flows," SGRT, Vol. 10, November 1969, pp. 549-558. (2b,4,6c).

A modified gravity model and concepts from Christaller and Zipt are used to identify the central city's zone of influence, the demographic and passenger-generating potential of the zone, and the population in any concentric ring in the zone or in the entire zone.

23. Ayre, Josephine. "History and Regulation of Trailer-on-Flatcar Movement," HRR, No. 153, 1967, pp. 1-30. (3,8a).

Traces the influence of the ICC through successive investigations and shows that piggy-back transport has increased due to recent ICC investigations.

24. Baker, Robert F. "A Practical View of the Systems Approach," TQ, Vol. 21, January 1967, pp. 471-486. (1,2a).

Identification of existing weaknesses in the systems approach to transportation.

25. Balchin, W.G.V. AIR TRANSPORT AND GEOGRAPHY. London, England: The Royal Geographical Society, 1947. (1,8d).

A pioneering effort to chart the geographic implications of a relatively new medium of transportation. A general background discussion is followed by descriptions of world air routes and regional air traffic patterns.

26. Balkus, Kozmas. "Transportation Implications of Alternative Sketch Plans," HRR, No. 180, 1967, pp. 52-70. (2b,4,6c).

A uniform application of travel generation criteria is applied to sets of population distributions. Trip generation is then estimated in several regions.

27. Balkus, Kozmas. "Metropolitan Highway Systems in the Framework of Social Welfare Decisions," PRSA, Vol. 22, 1969, pp. 39-64. (2a,4,5,8b).

Regression equations are used to determine the process of service standard formation, the norms that guide the distribution of services, and performance parameters of the system. A model of an optimum highway network is presented.

28. Ballard, Cordelle Kemper. "Transportation Dependents," TQ, Vol. 21, January 1967, pp. 83-90. (1,4).

An outline of the transport needs of the aged, suggesting that a comprehensive effort is needed to provide convenient modes of transportation.

29. Ballert, Albert G. "The Great Lakes Coal Trade: Present and Future," EG, Vol. 29, January 1953, pp. 48-59. (1,3c).

Discussion of temporal shifts in the volume of coal handled by selected ports and identification of the reasons for changes.

30. Bamford, Franklin. "Land-Use Control at Freeway Interchanges in California," TQ, Vol. 19, November 1965, pp. 541-555. (4,7a).

A call for continued local land use control to coordinate community adjustment and integrate the freeway into the community consistent with community values.

31. Bannard, J. W. "Some Current Thoughts on Transport Co-ordination," ITJ, Vol. 31, May 1966, pp. 370-376. (8).

The author calls for maintenance of competition between road and rail transport by the government to encourage forms of transport that would provide the right quality at the lowest cost.

32. Bardwell, George E. and Paul R. Merry. "Measuring the Economic Impact of a Limited-Access Highway on Communities, Land Use, and Land Values," HRBB 268, 1960, pp. 37-73. (2a,7a).

Analysis of sales tax collections to measure the economic impact of a highway on bypassed communities and on land value and land use to demonstrate preliminary effects of a partially completed limited access highway in Colorado.
33. Barker, T.C. "Passenger Transport in Nineteenth Century London," JTH, Vol. 6, May 1964, pp. 166-174. (3,8a,9).

A survey of source material.
34. Barloon, Marvin J. "The Interrelationship of the Changing Structure of American Transportation and Changes in Industrial Location," LE, Vol. 41, May 1965, pp. 169-179. (2a,5,7).

Examines the relationship between industrial location and transport systems, notes that U. S. industry is relatively footloose with respect to transport, and that "changes in industrial output and in location appear to alter the structure of transportation, rather than the converse."
35. Barnes, Charles F., Jr. "Integrating Land Use and Traffic Forecasting," HRBB 297, 1961, pp. 1-13. (4).

Discusses the procedures used and the basic information gained during the development of the land use analysis for the Hartford Area Traffic Study.
36. barrington, R. "The Hamburg Outer-Harbour Project and Related Developments," TEGS, Vol. 59, March-April 1963, pp. 106-103. (7c).

Describes a proposed site for harbor development needed to meet the demands created by new super tankers.
37. Barry, Walter A., Jr. "Proposed English Channel Tunnel: Its Estimated Traffic and Revenue," TQ, Vol. 15, April 1961, pp. 269-234. (1).

Discusses the findings of a survey to estimate traffic and revenues for an electric railway tunnel and concludes that such a tunnel is economically feasible.
38. Barton, Thomas Frank. "Railroads of Southeast Asia," JG, Vol. 59, 1960, pp. 21-33. (8a).

Examination of the major rail networks serving Thailand, Malaya, Cambodia, and Laos, surveying their extent, pattern, international aspects, passenger and goods flow, and future.

- Barton, Thomas Frank. "Outlets to the Sea for Land-Locked Laos,"
JG, Vol. 59, 1960, pp. 206-219. (1,8c).

Describes the need for access to ocean shipping, the effects of remaining French colonial rule, and the viability of potential outlets.

40. Bauer, K. W. "A Method for Attaining Realistic Local Highway System Plans," HRBB 326, 1962, pp. 37-45. (4,8b).

Concludes that most cities do not have long range plans and that local plans are quite ineffective in achieving integrated urban highways mainly because they are technically inadequate.

41. Bauer, K. W. "Use of Official Map Procedure to Reserve Land for Future Highways," HRR, No. 8, 1963, pp. 82-94. (5b,8b).

Outlines and demonstrates planning for official maps designating right-of-way lines and site boundaries for streets and highways to prevent extensive and costly development within these lines in Wisconsin.

42. Beaver, S. H. "Ships and Shipping: The Geographical Consequences of Technological Progress," G, Vol. 52, 1967, pp. 133-156. (6a,8c).

Discussion of three major results of technical progress leading to trade route changes: the substitution of oil for coal, the development of refrigeration, and changes in the nature of international trade that have both resulted from and influenced changes in ship construction.

43. Becht, J. Edwin. A GEOGRAPHY OF TRANSPORTATION AND BUSINESS LOGISTICS. Dubuque, Iowa: Brown Co., 1970. (1).

An introductory statement emphasizing transportation patterns, the role of terrain, climate, historical factors, carrier operations, and business logistics.

44. Beckman, Norman. "Impact of the Transportation Planning Process," TQ, Vol. 20, April 1966, pp. 159-173. (1).

A consideration of social, economic, and political effects of comprehensive transportation, encouraging a holistic approach to transport development.

45. Beckmann, Martin, C. B. McGuire, and Christopher B. Winsten. STUDIES IN THE ECONOMICS OF TRANSPORTATION. New Haven, Connecticut: Yale University Press, 1956. (2).

The purpose of the studies included within this volume is to develop and illustrate certain concepts, methods, and models that may have usefulness as points of departure for assessing capabilities and appraising efficiency of operation of transportation systems.

46. Beckmann, Martin, C. B. McGuire, and Christopher B. Winsten. "On the Theory of Traffic Flow in Networks," TQ, Vol. 21, January 1967, pp. 109-117. (2b,5a).

Discusses ideal properties of transportation theory of traffic flow, reviews basic models of flow having linear programming solutions, and comments on implications for road utilization and road benefits.

47. Beckmann, Martin, C. B. McGuire, and Christopher B. Winsten. "Principles of Optimum Location for Transportation Networks," QUANTITATIVE GEOGRAPHY PART I: ECONOMIC AND CULTURAL TOPICS. W. L. Garrison and D. F. Marble, eds., Evanston, Illinois: Department of Geography, Northwestern University, 1967, pp. 95-119. (2,5a,5b).

Discrete and continuous models of optimal network design are formulated in the paper which solve the optimal design problem: How should a given total sum available for initial construction and subsequent maintenance cost be allocated in order to effect the greatest savings in transportation cost for road users? The author contends that the models formulated are primarily valuable for heuristic purposes.

48. Beesley, M. E. and J. F. Kain. "Urban Form, Car Ownership and Public Policy: An Appraisal of Traffic in Towns," US, Vol. 1, November 1964, pp. 174-203. (1,4).

The "Traffic in Towns" report of 1963 is critically analyzed.

49. Beesley, M. E. and J. F. Kain. "Forecasting Car Ownership and Use," US, Vol. 2, November 1965, pp. 163-185. (2a,4).

Refines estimates of future levels of car ownership and transit use for Leeds, England, incorporating changes in urban form as a variable affecting car ownership and transit use.

50. Behling, Burton N. "Factors in Future Development of Rail Piggyback," HRR, No. 153, 1967, pp. 39-42. (8a).

51. Belousov, I. I. "Transportation and the Formation of Economic Regions," SGRT, Vol. 5, November 1964, pp. 19-23. (2a,7b).

A methodology for determining an optimal location pattern in the U.S.S.R. that would entail minimum combined production and transport costs for each product.

52. Ben, C., R. J. Bouchard, and C. E. Sweet, Jr. "An Evaluation of Simplified Procedures for Determining Travel Patterns in a Small Urban Area," HRR, No. 88, 1965, pp. 137-170. (2b,4,6c).

Concludes that detailed socio-economic data combined with limited travel data can be satisfactorily used to compute zonal trip productions and attractions.

53. Benepe, Barry. "Pedestrian in the City," TQ, Vol. 19, January 1965, pp. 28-42. (4).

Traces the development and decline of consideration of pedestrians in urban transport networks and sets criteria for planning for pedestrian use of streets on various street networks.

54. Benesh, Alvin H. "Traffic Assignments by the Shortest Path Method Using the TD Factor," TQ, Vol. 21, October 1967, pp. 553-567. (2b).

A weighting method is described to improve traffic assignments using the time-distance factor.

55. Benishay, Haskel and Gilbert R. Whitaker, Jr. "Demand and Supply in Freight Transportation," JOURNAL OF INDUSTRIAL ECONOMICS, Vol. 14, June 1966, pp. 243-262. (8).

A preliminary investigation of the market structure of the common carrier freight industry, providing estimates of demand elasticities, demand prices, and income elasticities for various transportation modes, and some "best conjecture" on the supply side and market structure of the industry. The results of regression analysis illustrate the difficulty in empirical analysis of an industry characterized by "excess capacities," regulation, differing firm production functions, and inadequate data.

56. Benishay, Haskel and Gilbert R. Whitaker, Jr. "Tax Burden Ratios in Transportation," LE, Vol. 43, February 1967, pp. 44-55. (8).

Tax burden ratios are discussed and computed for rail, motor, water, and pipe carriers.

57. Bennett, R. F. "Road Transport in a Rapid Transit System," ITJ, Vol. 32, March 1968, pp. 333-344. (8).

58. Bergsman, Joel. "Comments on Quandt and Baumol's Demand Model for Abstract Transport Modes," JRS, Vol. 7, Summer 1967, pp. 83-85. (2b).

Presents a quantitative example which "indicates that Quandt-Baumol's framework can be profitably used in an investment planning model" that is more realistic than the usual framework "which ignores the relationship between price and demand."

59. Berry, Brian J.L. and William Garrison. "A Source of Theory for Highway Impact Studies," HIGHWAY RESEARCH BOARD SPECIAL REPORT NO. 28, 1957, pp. 79-84. (2,7a,8b).
60. Berry, Brian J.L. and William Garrison. "Recent Studies Concerning the Role of Transportation in the Space Economy," AAG, Vol. 49, September 1959, pp. 328-342. (7).

The author reviews and evaluates the theoretical contributions of studies in which patterns of economic activity are related to transport systems, including the "Raum und Verkehr" series; highway impact studies conducted at the University of Washington; and investigations of the interrelationships of bus services, towns, and their hinterlands undertaken in Sweden and the United Kingdom.

61. Berry, Brian J.L. and Allan Pred. CENTRAL PLACE STUDIES: A BIBLIOGRAPHY OF THEORY AND APPLICATIONS. (Supplement). Philadelphia, Pennsylvania: Regional Science Research Institute. Bibliography Series No. 1. 1965. (1,4).
62. Berry Brian, J.L. and Allan Pred. ESSAYS ON COMMODITY FLOWS AND THE SPATIAL STRUCTURE OF THE INDIAN ECONOMY. Department of Geography Research Paper No. 111. Chicago, Illinois: University of Chicago, 1966. (2,6b).

This study provides a cartographic portrayal and statistical analysis of movements in 63 commodity groups overland and coastwise among 36 reporting units in India. The three essays, jointly prepared by various combinations of authors, comprise about 60 pages of text, the remainder of the volume being devoted to maps and tabulations.

63. Berry, Brian J.L. and Paul Schwind. "Information and Entropy in Migrant Flows," GA, Vol. 1, January 1969, pp. 5-14. (2a).

A review of information theory and entropy and their relevance to research design and inference in studies of migration.

64. Berry, Donald S., et al. THE TECHNOLOGY OF URBAN TRANSPORTATION. Evanston, Illinois: Northwestern University Press, 1963. (4,8f).

An understanding of the capabilities of the different types of facilities for urban transportation is important in planning for the efficient movement of persons and goods in metropolitan areas; this study presents, for each of several types of facilities, information on design features, capacity, performance, costs, and ranges in conditions for which each type might be best suited. Information is included on automotive transportation, various types of transit systems, possible innovations, and on central area circulation.

65. Best, Alan C.G. THE SWAZILAND RAILWAY: A STUDY IN POLITICO-ECONOMIC GEOGRAPHY. East Lansing, Michigan: African Studies Center, Michigan State University, 1966. (3,8a).

The purpose of this study is to examine the geographical aspects of the Swaziland railway from its inception during the eighteen-fifties to the present.

66. Betz, Mathew J. and Jankie N. Supusad. "Traffic and Staggered Working Hours," TQ, Vol. 19, April 1965, pp. 188-203. (4).

A method of staggering working hours to relieve congestion; the effects of staggering on land use, highway configuration, and transit planning.

67. Bevis, Howard W. "Forecasting Zonal Traffic Volumes," TQ, Vol. 10, No. 2, April 1956, pp. 207-222. (2b,4,6c).

Bevis uses Detroit Metropolitan Area Survey data to demonstrate an interactive technique for the prediction of inter-zonal trips, computing the probability of interchange and the index of friction.

68. Bieber, Alain. "Modal Evolution of Inter-city Travel Demand: A Markovian Analysis," TRANSPORTATION RESEARCH, December 1967, pp. 311-337. (2a,4).

69. Bielak, Stanley F. and James F. McCarthy. "Highway Income, Expenditures, and User-Tax Earnings in Standard Metropolitan Statistical Areas," HRR, No. 106, 1966, pp. 58-76. (4).

Compares highway income, expenditures, and highway-user earnings for selected SMSA's. User income sources provided almost seventy-five percent of the revenue income.

70. Bird, James. THE GEOGRAPHY OF THE PORT OF LONDON. London, England: Hutchinson University Press, 1957. (7c).

The author contends that it is much more convenient to define a port in terms of its function rather than in terms of its form. Hence, the essential task performed in this study was to trace and describe the development of those areas where the function of transshipment was carried out in the port areas of metropolitan London. The complicated forms of this transshipment function suggest that it is impossible to make precise linear limits to the port of London.

71. Bird, James. "Seaports and the European Economic Community," GEOGRAPHICAL JOURNAL, Vol. 133, September 1967, pp. 302-328. (7c,8c).

Using E. E. C. data, this paper presents problems of maritime transport and calls for reconsideration of seaport development and policy decision-making to improve future planning of seaports.

72. Bird, James. "Traffic Flows to and from British Seaports," G, Vol. 54, July 1969, pp. 284-302. (6a).

A review using recent data.

73. Birkhead, E. "The Financial Failure of British Air Transport Companies," JTH, Vol. 4, May 1960, pp. 133-145. (3,8d).

Treats the uneconomical aspects of early twentieth century air transport.

74. Black, Alan. "A Method for Determining the Optimal Division of Express and Local Rail Transit Service," HRBB 347, 1962, pp. 106-120. (2a,5,8a).

Proposes a breakpoint on radial routes allowing local trains to serve the area between the breakpoint and the CBD and express trains to serve the area beyond the breakpoint.

75. Black, Alan. "Comparison of Three Parameters of Nonresidential Trip Generation," HRR, No. 114, 1966, pp. 1-7. (2b,4,6c).

Compares land use, land and floor area, and employment in an attempt to determine the best type of measurement from which to estimate trips to non-residential areas. The findings indicate that no one method is best, but that floor area is best for commercial, employment for manufacturing, and land use for public buildings.

76. Bleile, George W. and Leon M. Moses. "Transportation and the Spatial Distribution of Economic Activity," HRBB 311, 1962, pp. 27-30. (2a,4,7).

This article deals with aspects of the suburbanization of economic activity, concentrating on intra-metropolitan distribution of manufacturing. It compares relocation patterns for large and small firms and supports the hypothesis that the inner city is the "seedbed" of new small enterprise.

77. Blurton, Michael A.S. "Special Bus Service," TE, Vol. 37, February 1967, pp. 17-20. (4,8).

Compares mass transit demonstration projects in Peoria and Decatur, Illinois, and indicates changes which may encourage greater use of mass transit systems.

78. Boal, F. W. and D. B. Johnson. "The Functions of Retail and Service Establishment on Commercial Ribbons," CG, Vol. 9, No. 3, 1965, pp. 159-169. (2a,4).

A review of current concepts concerning the character and function of commercial ribbons and the examination of the function of one such ribbon in Calgary, Alberta. Concludes that the central place concept is applicable to the commercial ribbon, but that such application would be operationally complex because of the mixture of establishment types on such ribbons and their functional overlap.

79. Borchert, John R. and Donald D. Corroll. "Time-Series Maps for the Projection of Land-Use Patterns," HRBB 311, 1962, pp. 13-26. (2a,4).

By times series mapping of residential and commercial land-use patterns, future patterns are extrapolated for use in highway planning.

80. Borchert, John R. "American Metropolitan Evolution," GR, Vol. 57, July 1967, pp. 301-332. (2a,3,4,7).

Presents the evolution of the present pattern of SMSA's from 1790 to 1960, identifying four major epochs in American history: soilwagon era, 1790-1830; iron horse era, 1830-1870; steel rail era, 1870-1920; and auto-air-amenity era, 1920-, discussing the technological innovations which characterize each epoch.

81. Bostick, T. A. and T. R. Todd. "Travel Characteristics of Persons Living in Larger Cities," HRR, No. 106, 1966, pp. 52-57. (4,6c).

Using nationwide automobile use survey data, the authors relate the choice of travel modes to the nearness of public transportation, the distance to work, and family income. The use of the automobile, the dominant mode of transportation, tends to increase with income.

82. Botha, D. "A Descriptive Model of Social Contacts within a Community," EKISTICS, Vol. 30, August 1970, pp. 110-116. (2a,4).

"The purpose of this study is to determine the variables influencing the level and character of the social contacts within communities of around 7,000 people."

83. Botzow, Hermann. "An Empirical Method for Estimating Auto Commuting Costs," HRR, No. 197, 1967, pp. 56-70. (2b).

By estimating auto operating costs for counties within the study region, significant variations in cost per car and cost per car mile are indicated.

84. Bouchard, Richard J. and Clyde E. Pyers. "Use of Gravity Model for Prescribing Urban Travel: An Analysis and Critique," HRR, No. 88, 1965, pp. 1-43. (2b,4,6c).

For the gravity model to accurately describe traffic flow, the model should incorporate average area travel time factors, should stratify trips or balance interzonal attraction factors, and should be adjusted for geographic bias.

85. von Böventer, Edwin. "The Relationship between Transportation Costs and Location Rent in Transportation Problems," JRS, Vol. 3, Winter 1961, pp. 27-40. (2a,6,7).

Discusses the "simultaneous determination of transport costs and rent payments at both the production and consumption sites."

86. von Böventer, Edwin. "Comments on Kadas," PRSA, Vol. 12, 1963, pp. 203-209. (2a,7).

Discusses the interaction between internal economies and transportation costs and the role of input-output studies as indicators of a region's economic structure, and suggests closer examination of the problem of agglomeration economies and diseconomies.

87. Bowersox, Donald J. "Influences of Highways on Selection of Six Industrial Locations," HRRB, No. 268, 1960, pp. 13-23. (7a).

A report on the findings of interviews with representatives of six industrial firms adjacent to free access roads. For these firms the highways influence was considered important but not critical.

88. Boyce, Byrl W. "Excess Acquisition Revisited: Control of Land Use at the Interstate Interchange," LE, Vol. 45, August 1969, pp. 293-303. (7a).

Methods of land use regulation are evaluated.

89. Boyce, David E. "The Effect of Direction and Length of Person Trips on Urban Travel Patterns," JRS, Vol. 6, Summer 1965, pp. 65-80. (2a,4,6c).

Tests existing theoretical constructs through the application of multi-variate analysis to urban travel data, specifically testing the assumption that trip volume is independent of the direction of the trips.

90. Boyce, David E. and Seymour E. Goldstone. "A Regional Economic Simulation Model for Urban Transportation Planning," HRR, No. 149, 1966, pp. 29-41. (2a,4).

Treats forecasts of population and employment for urban transportation regions using a regional simulation model consisting of a set of recursive difference equations describing the demographic and employment sectors of a metropolitan region.

91. Boyce, David E. and Seymour E. Goldstone. "Effect of Trip Direction on Inter-zonal Trip Volumes: Test of a Basic Assumption of Trip Distribution Models," HRR, No. 165, 1967, pp. 76-88. (2a,4,6c).

Using an analysis of variance of interzonal trip data, the author tests the assumption that interzonal volumes are independent of the location of zones and are instead a function of the separation of zones. The findings substantiated the assumption for arterial trips, but not for transit trips. The study also indicates the uniformity of the total trip pattern by trip direction.

92. Boyd, Alan S. "The United States Department of Transportation," JOURNAL OF AIR LAW & COMMERCE, Vol. 33, Spring 1967, pp. 225-233. (1).

Discussion of the administrative structure of the Department of Transportation.

93. Boyce, Yngve. ROUTING METHODS: PRINCIPLES FOR HANDLING MULTIPLE SALESMEN PROBLEMS. Lund Studies in Geography, Series C, No. 5, Lund, Sweden: C. W. K. Gleerup, 1965. (2,5a,5b).

94. Branch, Melville C. "Urban Planning and the New Mobility," JOURNAL OF AMERICAN INSTITUTE OF PLANNERS, Vol. 30, February 1964, pp. 2-6. (4,8a).

Traces the increase in helicopter passenger airlines and recommends analysis of their disruptive effects before their use becomes widespread.

95. Brant, Austin E., Jr. and Dana E. Low. "Cost-Saving Techniques for Collection and Analysis of Origin-Destination Survey Data," HRR, No. 205, 1967, pp. 50-66. (9).
96. Brenner, Robert. "Geometrics as an Approach to Macroscopic Theories of Traffic Flow," HRR, No. 15, 1963, pp. 44-59. (2b,6).

Borrowing concepts from thermodynamics, Brenner proposes a theoretical schema that would identify stable, unstable, and metastable regions of space, providing macroscopic variants for operational decisions. The approach offers a type of sensitivity analysis pursuant to operational decision making and investigation of traffic flow problems.

97. Brigham, Eugene F. "The Determinants of Residential Land Values," LE, Vol. 41, November 1965, pp. 325-334. (4,7).

Describes and tests a model of single-family residential land values in Los Angeles County, California, incorporating site characteristics of accessibility, amenities, topography, present and future use, and certain historical factors.

98. Britton, John N.H. "The Development of Port Kembla, N. S. W.," G, Vol. 46, July 1961, pp. 247-250. (7c).

A berth and an inner harbor are the two main needs to improve Port Kembla's capacity to handle cargo.

99. Britton, John N.H. "The Transport Functions of Port Kembla," EG, Vol. 38, October 1962, pp. 347-358. (7c).

Presents a detailed analysis of the composition and direction of cargo moving through Port Kembla, Australia; examines foreland and hinterland patterns using the origins and destinations of community flow; and treats the significance of secondary industry and competitive forces which influence port viability.

100. Britton, John N.H. "Interstate Transport Competition and the Port of Melbourne," AUSTRALIAN GEOGRAPHICAL STUDIES, Vol. 1, October 1963, pp. 84-95. (7c).
101. Britton, John N.H. "The External Relations of Seaports: Some New Considerations," TEGS, Vol. 56, May-June 1965, pp. 109-112. (6a,7c).

Consideration of the flow patterns of Melbourne using descriptive and inferential statistical techniques in an attempt to distinguish discrete foreland characteristics produced by combinations of commodities. The author concludes that full understanding of a port's external relations is only achieved through combining the commodity flow approach with analysis of foreland characteristics.

102. Britton, John N.H. "Coastwise External Relations on the Ports of Victoria's coastwise general cargo import and export system by presenting a descriptive outline of patterns of commodity flows and analyzing foreland characteristics.
103. Britton, John N.H. "A Geographical Approach to the Examination of Industrial Linkages," CG, Vol. 13, Autumn 1969, pp. 185-198. (2,6b).

Residuals from regression and the gravity model are used to identify interregional manufacturing links. Patterns of freight dispatches can be explained considerably by the market size of each region and distance from the zone by origin.

104. Brodsky, Harold. "Highways and Outdoor Recreation," HRR, No. 161, 1967, pp. 22-29. (8b).

A wide-ranging discussion of highways as a recreational resource, highway accessibility, and the crisis in outdoor recreation.

105. Brookfield, H. C. "New Railroad and Port Developments in East and Central Africa," EG, Vol. 31, January 1955, pp. 60-70. (7c,8a).

The status of schemes to expand rail and port facilities contrasting transport development in two areas of Africa.

106. Brooks, Peter W. "The Development of Air Transport," JTEP, Vol. 1, May 1967, pp. 164-173. (3,8d).

The history of aviation over six decades on the continents.

107. Brown, Lawrence A. and Frank E. Horton. "Functional Distance: An Operational Approach," GA, Vol. 2, January 1970, pp. 76-83. (2a,6b).

Using a Markov model, mean first passage time is calculated as a measure of functional distance, using migration data from New York State.

108. Brown, Lawrence A. and Frank E. Horton. "On the Use of Markov Chains in Movement Research," EG, Vol. 46, June 1970, pp. 393-403. (1,2a).

A discussion of Markov chains as a descriptive tool and as a model of geographic systems and processes.

109. Brown, Lawrence A. and David B. Longbrake. "Migration Flows in Intraurban Space: Place Utility Considerations," AAAG, Vol. 60, June 1970, pp. 368-384. (2a,4).

The main objective is the construction and evolution of place utility functions based on socioeconomic and migration characteristics using 1966-67 Cedar Rapids data.

110. Brown, Lawrence A., John Odland, and Reginald G. Golledge. "Migration, Functional Distance, and the Urban Hierarchy," EG, Vol. 46, July 1970, pp. 472-485. (2a,6b).

Using the one-hundred largest SMSA's, the study focuses on a hierarchical classification of places and identification of system-wide migration fields for each SMSA.

111. Brown, Robert T. and Clell G. Harral. "Estimating Highway Benefits in Under-developed Countries," HRR, No. 115, 1966, pp. 29-43. (2a,7b).

Presents both a non-mathematical and algebraic model to demonstrate the maximum difference between the contributions which highway projects make to national income and the cost of the projects.

112. Brown, Robert T. TRANSPORT AND THE ECONOMIC INTEGRATION OF SOUTH AMERICA. Washington, D.C.: Brookings Institution, 1966. (7b).

This study attempts to present in broad outline a transportation strategy for the whole continent of South America, since economic development efforts in Latin America have been focuses primarily on the problems and potentials of individual countries in isolation. The basic assumption is that Latin American economic progress requires larger export markets, a wider geographic distribution of industrial activity, and interdependence in marketing and transportation.

113. Brown, Samuel P. "The Future of Toll Roads," TQ, Vol. 15, July 1961, pp. 520-534. (7,8b).

The national and regional impact of the inter-state system of toll roads in the United States.

114. Bruck, H. W., Stephen H. Putman, and Wilbur A. Steger. "Evaluation of Alternative Transportation Proposals: The Northeast Corridor," JOURNAL OF THE AMERICAN INSTITUTE OF PLANNERS, Vol. 32, November 1966, pp. 322-333. (2a,7).

Examination of some of the indirect consequences of alternative transportation investments in the northeast corridor. Impact modeling may be an aid in estimating and evaluating the consequences of demographic, economic, and land use changes.

115. Buchanan, Colin D. "Britain Road Problems," GEOGRAPHICAL JOURNAL, Vol. 130, December 1964, pp. 470-483. (1,3,4,5).

Reflections on the introduction of the automobile in Great Britain, new road construction connecting urban centers, and the problem of providing efficient circulation while also providing surroundings reasonably free from adverse environmental effects of motor traffic.

116. Buhl, Walter F. "Intercity Highway Transport Share Tends to Vary Inversely with Size of Plant," HRR, No. 175, 1967, pp. 9-14. (8b).

This article is concerned with the relationship between highway carrier share and the traffic characteristics of: commodity, size of shipment, and distance.

117. Buhr, Johann H., Donald R. Drew, Joseph A. Wattleworth, and Thomas G. Williams. "A Nationwide Study of Freeway Merging Operations," HRR, No. 202, 1967, pp. 76-122. (8b,9).

A description of air photographic techniques, data reduction methods, and the variety of data which may be used in merging studies.

118. Bunge, William. "Toward a General Theory of Movement," THEORETICAL GEOGRAPHY. Lund, Sweden: C. W. K. Gleerup, 1962, pp. 108-129. (2a).

This chapter of Bunge's larger text includes a brief comment on general flow models, a review of spatial movement theories in their traditional categories based on subject matter, and a discussion of their abstract spatial properties, leading to a reclassification of the theories and a conclusion which comments on geographic unity. The author strives to unite two bodies of theory: central place theory and movement theory.

119. Bunke, Harvey C. "The Status of Rate-Making," LE, Vol. 36, May 1960, pp. 129-141. (3,8).

Historical review of rate regulation in the United States indicates a fundamental shift in rate making policy showing that competitive pricing is essential if the transportation system, specifically the railroads, is to be operated as an economic enterprise.

120. Bunker, R. "Travel in Stevenage," TPR, Vol. 38, October 1967-68, pp. 215-232. (4).

Using descriptive statistics, this summary of a travel survey in Stevenage points out the need for concern with the regional and functional relationships of future new towns.

121. Burch, James S. "Traffic Interactance between Cities," HRBB, No. 297, 1961, pp. 14-17. (2b,4,6b).

Evaluation of the interaction between five cities and towns in North Carolina, using a quadratic adaption of the gravity model to predict traffic exchange.

122. Burghardt, Andrew F. "The Origin and Development of the Road Network of the Niagara Peninsula, Ontario, 1770-1851," AAG, Vol. 59, September 1969, pp. 417-440. (3,5,8b).

Historical analysis suggests that Indian trails did not predetermine the road alignments and that towns created roads, rather than vice versa.

123. Burton, Robert C. and Frederick D. Knapp. "Socio-Economic Change in Vicinity of Capital Beltway in Virginia," HRR, No. 75, 1964, pp. 32-47. (7a).

Changes in land and real property values, land uses, traffic patterns, travel habits, and business activity associated with an interstate highway over a period of time.

124. Burtt, Everett J., Jr. "Workers Adapt to Plant Relocation in Suburbia (Greater Boston)," MONTHLY LABOR REVIEW, April 1968, pp. 1-5. (4,6c).
125. Butas, Larry F. "Various Simultaneous Equation for Interzonal Divergences and Link Assignments," TQ, Vol. 18, July 1964, pp. 383-405. (2a,4).

A method for determining the manner in which interzonal trip transfers diverge and take on various lengths.

126. Butas, Larry F. "Simultaneous Differential Equations for Trip Distributions," TQ, Vol. 20, April 1966, pp. 248-267. (2b,6c).

Develops a dynamically interdependent model, which compares favorably in empirical results with the modified gravity model.

127. Cameron, M. A. "Theory and Practice in Transport," ITJ, Vol. 31, November 1964, pp. 20-23. (1).
128. Campbell, Thomas C. "Agricultural Exemptions from Motor Carrier Regulation," LE, Vol. 36, February 1960, pp. 14-25. (8b).

The issue of non-uniform regulation of carriers and commodities is analyzed in an examination of the Motor Carrier Act of 1935 and Transportation Act of 1958.

129. Campbell, Wilson E. "Transportation System Corridors," HRR, Vol. 166, 1967, pp. 26-35. (1).
130. Campbell, Wilson E. "An Evaluation of Alternative Land Use and Transportation Systems in the Chicago Age," HRR, No. 238, 1968, pp. 103-115. (4,6c).

CAT's role in a land use and transportation study is described.

131. Cannon, John G. "Historic Old Sacramento and U. S. Interstate Route 5," TQ, Vol. 19, July 1965, pp. 405-412. (4,5b).

Discusses cooperative planning of a freeway and a historic renewal area in downtown Sacramento.

132. Cano, Jose Luis. "Freeways in Lima, Peru," TE, Vol. 36, August 1966, pp. 54-57. (4,7c).

A brief overview.

133. Carlson, Fred A. "Traffic on the Ohio River System," JG, Vol. 59, November 1960, pp. 357-360. (8c).

Traffic and construction on the Ohio River.

134. Carlson, Robert E. "British Railroads and Engineers and the Beginnings of American Railroad Development," BUSINESS HISTORY REVIEW, Vol. 34, Summer 1960, pp. 137-149. (3,8a).

135. Carroll, J. Douglas, Jr., and Gerald P. Jones. "Interpretation of Desire Line Charts Made on a Cartographatron," HRBB, 253, 1960, pp. 86-108. (9).

136. Carroll, J. Douglas, Jr., and Roger L. Creighton, and John R. Hamburg. "Transportation Planning for Central Areas," JOURNAL OF AMERICAN INSTITUTE OF PLANNERS, Vol. 27, February 1961, pp. 26-34. (4).

137. Carrothers, Gerald A. P. "An Historical Review of the Gravity and Potential Concepts of Human Interaction," JOURNAL OF AMERICAN INSTITUTE OF PLANNERS, Vol. 22, Spring 1956, pp. 94-102. (2b).

Discusses and explains various models and formulæ, including a bibliography (83 English written articles and books).

138. Carter, John F. "The Urban Traffic Problem," TQ, Vol. 16, April 1962, pp. 260-270. (1,4).

A general discussion.

139. Carter, Richard E. "A Comparative Analysis of United States Ports and Their Traffic Characteristics," EG, Vol. 38, April 1962, pp. 162-175. (7c).

A series of maps are analyzed in a general discussion of United States water traffic.

140. Casetti, Emilio. "Optimal Location of Steel Mills Serving the Quebec and Southern Ontario Steel Market," CG, Vol. 10, No. 1, 1966, pp. 27-39. (2a,6b,7).

Linear programming techniques are used to analyze both the impact of increased steel consumption in Canada and the impact of iron ore shipments from Seven Islands to Great Lakes steel centers on the optimum location of steel mills supplying the Canadian market.

141. Caswell, Stearns W. "Effect of Zone Size on Zonal Interchange Calculations Based on the Opportunity Model in a Homogeneous Region," HRR, No. 165, 1967, pp. 22-40. (2b,4,6c).

Errors in interzonal trip distributions arise from zone size, trip density, and the trip generation constant used in the model. Smaller zones permit more accurate calculations of zonal trip interchange.

142. Caswell, Stearns W. "A Theoretical Model for Determination of Expressway Usage in a Uniform Region," HRR, No. 238, 1968, pp. 79-102. (2a,7a).

Mean trip density is estimated for isolated and parallel freeway networks with limited and unlimited accessibility.

143. Cella, Francis R. "Highway Location and Economic Development," HRBB 327, 1962, pp. 73-76. (5b,7a,7b).

Factors for use in determining economic effects of highway locations are identified.

144. Cernakian, Jean. "The European Inland Waterways Network: A Case Study in the Geography of European Cooperation," YEARBOOK OF THE ASSOCIATION OF PACIFIC COAST GEOGRAPHERS, Vol. 28, 1966, pp. 175-179. (8c).

145. Chacey, D. Kenneth. "Ground Transportation in the Years Ahead," TQ, Vol. 18, April 1964, pp. 188-201. (1,8).

Discusses today's transport problems and the need for new concepts for their solution.

146. Chang, Sen-Dou. "Land Use and Intra-Urban Travel in Taipei," PROCEEDINGS, A. A. G., Vol. 2, 1970, pp. 40-45. (4,7,8).

The impact of rapid urban development on travel (commuting distances and congestion).

147. Chapman, Albert S. "Trans-Europe Express: Overall Travel Time in Competition for passengers," EG, Vol. 44, October 1968, pp. 283-295. (6a,8).

Compares TEE travel time with air travel time from selected traffic generating centers to principal destinations. It is suggested that short to moderate length trips are best served by Trans-Europe Express.

148. Charnes, A., S. C. Littlechild, M. J. L. Kirby, and W. M. Raïke. "Chance Constrained Models for Transport Pricing and Scheduling under Competition," TS, Vol. 2, February 1968, pp. 57-76. (2a).

A "nodel-link" mathematical model.

149. Cherner, Morrie. "Property Values as Affected by Highway Landscape Developments," HRR, No. 53, 1964, pp. 4-7. (4,7a).

This Chicago area study indicates that over time the value of residential property adjacent to freeways was not lower than similar property at a slightly greater distance from freeways, and people interviewed agreed that the beauty of the freeway adjacent to their property was due to the highway's landscaping.

150. Cherniack, Nathan. "Critique of Home-Interview Type O-D Surveys in Urban Areas," HRBB 253, 1960, pp. 166-188. (4,9).

151. Cherniack, Nathan. "A Statement of the Urban Passenger Transportation Problem," HRBB 293, 1961, pp. 21-32. (4,8f).

Alternative methods of urban transportation are evaluated and conditions in urban areas that help to create inadequate metropolitan transportation systems are discussed.

152. Chigarkin, A. V. "The Use of Landscape Surveys in the Planning of New Railroads," SGRT, Vol. 4, May 1963, pp. 30-37. (5b,8a).

A study of "specific railroad-building problems, such as landforms, geology, water supply, availability of road ballast," as well as the effect of agriculture and mineral exploitation.

153. Chinitz, Benjamin. "The Effect of Transportation Forms on Regional Economic Growth," TQ, Vol. 14, April 1960, pp. 129-142. (2a,7b).

Treatment of the historic role of transport cost in the U.S. (centralization and decentralization phases) and its relationship to industrial location, products shipped, and length of haul.

154. Christensen, David E. "A Simplified Traffic Flow Map," PG, Vol. 13, 1961, pp. 21-22. (9).
155. Christensen, David E. "The Auto in America's Landscape and Way of Life," G, Vol. 51, November 1966, pp. 339-348. (1,8b).

Brief overview of automotive transportation in America.

156. Church, Donald E. "Volume and Characteristics of Intercity Travel During Winter 1963," HRR, No. 64, 1964, pp. 100-105. (4,6c).
157. Church, Donald E. "New Trucking Data from 1963 Census of Transportation," HRR, No. 82, 1965, pp. 38-53. (9).
158. Church, Donald E. "Impact of Size and Distance on Intercity Highway Share of Transportation of Industrial Products," HRR, No. 175, 1967, pp. 1-8. (8b).
159. Clark, Colin. "Transport: The Maker and Breaker of Cities," TPR, Vol. 28, 1958, pp. 237-250. (1,3,2).
160. Clark, Colin, and G. H. Peters. "The 'Intervening Opportunities' Method of Traffic Analysis," TQ, Vol. 19, January 1965, pp. 101-119. (2b,4,6c).

An application of the model to London and Copenhagen. "The principal of 'intervening opportunities' appears to be an important step forward in our knowledge relating to travel habits . . . and it undermine(s) our faith in the effects of distance."

161. Clark, Colin and Hans Rudolf Roeske. "The 'Intervening Opportunities' Method--West Midlands Traffic Study," TQ, Vol. 23, July 1969, pp. 365-377. (2b,4,6c).

The intervening opportunities model is used to comparatively describe travel patterns of male and female and manual and non-manual workers, the friction of distance being greater for female and non-manual workers.

162. Clark, J. E., III, and D. A. Morin. "Securing Travel Data by Telephone Interviews," TE, Vol. 36, June 1966, pp. 47-49. (9).

163. Clark, W.A.V. "Consumer Travel Patterns and the Concept of Range," AAAAG, Vol. 58, June 1968, pp. 386-396. (2,6).

Less than one-half of those surveyed purchased goods and services at the nearest center offering those goods and services, and significant differences in trip length were noted. This indicates modification of the "range of a good" concept.

164. Clark, W.A.V. "Measurement and Explanation in Intra-Urban Residential Mobility," TEGS, Vol. 61, January-February 1970, pp. 49-57. (2,4,6c).

"This study first examines the reasons given by a sample of movers for changing residence, both to test the generalizations (on why people move) drawn from the literature, and to test the extent to which reasons for movement are related to spatial patterns of movement. A second concern is with the simulation of the spatial patterns of intra-urban movement."

165. Clark, W.A.V. and Gerald Rushton. "Models of Intra-Urban Consumer Behavior and Their Implications for Central Place Theory," EG, Vol. 46, July 1970, pp. 486-497. (2a).

Testing the "nearest center hypothesis."

166. Clarke, J. I. "The Trans-Cameroon Railway," G, Vol. 51, January 1966, pp. 55-58. (3,8a).

Brief summary of the history and extent of railroads.

167. Clawson, Marion. "Implications of Recreational Needs for Highway Improvements," HREB 311, 1962, pp. 31-38. (7a).

Basic factors of outdoor recreation demand and their impact on future highway use are examined. It is concluded that most highways are not well suited for handling future recreation traffic; yet outdoor recreation travel demands will be a major constituent of total highway demands in the future.

168. Clayton, John E. "Containerization in Transporting Agricultural Perishables," HRR, No. 153, 1967, pp. 54-59. (1).

169. Cline, Marvin G. "Urban Freeways and Social Structure--Some Problems and Proposals," HRR, No. 2, pp. 12-20. (4,7a).

Literature associated with highway development and social change is reviewed under the general headings of the city as a social system, psychological impact of physical disruption and psychological disruption, and social functioning. Including social science research in highway planning may minimize social and psychological disruption.

170. Clozier, Rene. GEOGRAPHIE DE LA CIRCULATION. Paris, France: Editions Genin, 1963. (1).

This test provides a highly descriptive regional account of the development of various modes of transport throughout the world.

171. Cole, Leon Monroe. "Transport Investment Strategies and Economic Development," LE, Vol. 44, August 1968, pp. 307-319. (7b).
172. Coleman, Robert R. "A Study of Urban Travel Times in Pennsylvania Cities," HRBB 303, 1961, pp. 62-75. (4).
173. Collins, Frederick L. and Adolf D. May, Jr. "A Computer Program for Freeway and Highway Capacity," TE, Vol. 38, April 1968, pp. 44-49. (2b).

The program calculates service volume, number of lanes, and level of service.

174. Colwell, Robert C. "Interactions between Transportation and Urban Economic Growth," HRR, No. 23, 1963, pp. 6-11. (7b).
175. Conant, Michael. "The Myth of Inter-Railroad Competition," LE, Vol. 38, August 1962, pp. 249-255. (8a).

The structural oligopoly of the railroad industry and peculiar market and cost structures negate competition between railroads. Poolings and consolidations should be required to enable a more economical allocation of resources.

176. Conley, J. H., R. S. Farnsworth, E. Koenigsberg, and V. Wiersma. "A Linear Programming Approach to the Total Movement of a Homogeneous Product," TS, Vol. 2, November 1968, pp. 289-302. (2b).
177. Connally, Julia A. and Charles O. Meiburg. "The Washington Capital Beltway and Its Impact on Industrial and Multi-Family Expansion in Virginia," HRR, No. 217, 1968, pp. 9-27. (4,6c,7a).

Access to freeway facilities is stated as a major factor in industrial location. Changing commuting patterns and expansion of the area's laborshed result from the opening of the beltway. To ease congestion at inter-changes, rezoning of land use is suggested.

178. Conway, Thomas, Jr. "Rapid Transit Must Be Improved to Alleviate Traffic Congestion," TQ, Vol. 16, January 1962, pp. 103-118. (4,8).

The description of rapid transit services in two large cities.

179. Cook, W. R. "Transport Decision of Certain Firms in the Black Country," JTEP, Vol. 1, September 1967, pp. 325-344. (7,8).

The decision-making process is significantly influenced by personal qualities of the decision makers. While transport costs are important, they are not always a decisive factor; desired quality of transport service varies with each firm.

180. Corradino, Joseph C. "The Effect of the Highway System and Land Development on Trip Production," TE, Vol. 38, June 1968, pp. 32-39. (2b,4,6c,7a).

Quantifies relationships between trip-making and land use, economic status of travelers, and capabilities of transport system to predict future trip-making.

181. Corradino, Joseph C., and Michael G. Ferreri. "In-Flight Origin-Destination Study at Philadelphia International Airport," HRR, No. 274, 1969, pp. 35-43. (9).

182. Cox, Kevin. "The Application of Linear Programming to Geographic Problems," TEGS, Vol. 56, July-August 1965, pp. 228-235. (2a,6b).

An introduction to the transportation model and an application to aluminum bar flows.

183. Coyle, John J., H. Kirk Dansereau, John C. Frey, and Robert D. Pashek. "Interchange Protection and Community Structure," HRR, No. 75, 1964, pp. 62-74. (2a,4,5b,7a).

To aid in the selection of locations for interchanges in rural and suburban areas, the factors of community growth, land use planning, and community structure are used to develop a model for land use planning at interchanges.

184. Creighton, Roger L., Irving Hoch, Morton Schneider, and Hyman Joseph. "Estimating Efficient Spacing for Arterial and Expressways," HRBB 253, 1960, pp. 1-43. (2a,4,5b).

185. Creighton, Robert L., Irving Hock, Morton Schneider, and Hyman Joseph. "Transportation in Regional Development," HSGTJ, Vol. 2, January 1968, pp. 1-7. (4,7b).

To reverse the trend of unplanned urban growth, it is suggested that population should be concentrated along appropriate transport corridors in accordance with a regional development plan.

186. Creighton, Roger L., Irving Hoch, Morton Schneider, and Hyman Joseph. "Measurements and the Regional Planning Process," HRR, No. 229, 1968, pp. 1-6. (7b).

The regional planning process is outlined with reference to the role of transportation in regional development.

187. Crevo, Charles C. "Characteristics of Summer Weekend Recreational Travel," HRR, No. 41, 1963, pp. 51-60. (6b).

An analysis of travel time, vehicle occupancy, trip production and population density, and hourly distributions of vehicles arriving at recreational sites indicates facilities at these locations do not influence the length of travel time, although car occupancy varies with facilities available.

188. Cribbins, P. D., W. T. Hill, and H. O. Seagraves. "Economic Impact of Selected Sections of Interstate Routes on Land Value and Use," HRR, No. 75, 1964, pp. 1-31. (7a).

It is concluded that controlled access facilities have done little to stimulate or depress land values and development during the study periods.

189. Cullen, Donald E. "Labor-Market Aspects of the St. Lawrence Seaway Project," JOURNAL OF POLITICAL ECONOMY, Vol. 68, June 1960, pp. 232-251. (6,7).

The sources of the workers employed, their commuting patterns, and the project's impact on area wage and labor supply.

190. Curry, S. Leigh, Jr. "Urban Renewal and Urban Transportations: Contrasting Concepts and Methods," HRR, No. 137, 1966, pp. 22-24. (1,4).

Community participation in urban renewal programs is contrasted with the lack of community participation in transportation planning.

191. Curtis, William H. "An Analysis and Evaluation of Urban Street Patterns Possible with a Freeway Network," TE, Vol. 33, October 1962, pp. 16-23. (2a,4,5a).

An analysis of two types of street patterns that can be utilized where a freeway system is superimposed over an existing grid street system indicates the differentiated, non-continuous street pattern is equal to or superior to a continuous grid pattern, when used in conjunction with a freeway system.

192. Dansereau, H. Kirk, John C. Frey, and Robert D. Pashek.
"Highway Development, Community Attitudes and Organization," HRR, No. 16, 1963, pp. 44-59. (4,7a).

Discussion of community social structure, attitudes, and complexity.

193. Dansereau, H. Kirk, John C. Frey, and Robert D. Pashek.
"Five Years of Highway Research: A Sociological Perspective," HRR, No. 75, 1964, pp. 76-81. (1,4,7a).

The impact of highways on two communities is analyzed with respect to population growth, level of living, attitude change, community organization and highway use. The results indicate population growth, rising levels of living, and increased community organization. Community participation in the planning process is recommended.

194. Davis, Howard W. "A Review of Federal Rate Regulation and Its Impact upon the Railroad Industry," LE, Vol. 44, February 1968, pp. 1-10. (8a).

Procedural delays, inequities in rate regulation, and the concept of a maximum rate indicate federal rate regulation has adverse consequences for railroads.

195. Davis, J. Tait. "Parkways, Values and Development in the Washington Metropolitan Region," HRR, No. 16, 1963, pp. 32-43. (4,7a).

Factor analysis of land value variation patterns between parkway and non-parkway facilities.

196. Dayal, Edison. "The Changing Patterns of India's International Trade," EG, Vol. 44, July 1968, pp. 240-269. (6a).

The areal features of India's trade linkages (imports and exports).

197. Deen, Thomas B., William L. Mertz, and Neal A. Irwin.
"Application of a Modal Split Model to Travel Estimates for the Washington Area," HRR, No. 38, 1963, pp. 97-123. (2b,4,6c).

The gravity model and a modal split model are used to test modal split implications of two proposed land use plans. A test of the modal split model produced accuracy sufficient for planning purposes.

198. Deen, Thomas B., William L. Mertz, and Neal A. Irwin.
"A Study of Transit Fringe Parking Usage," HRR, No. 130,
1966, pp. 1-19. (4,8f).

The feasibility of extended use of fringe parking facilities is examined. The viability of the facilities is discussed with reference to proximity to the alternative mode of travel, the type of alternate travel mode, trip purpose, and costs of parking.

199. Demaree, Allan T. "Cars and Cities on a Collision Course,"
FORTUNE, February 1970, pp. 124-128. (1,4).

200. Despicht, Nigel S. POLICIES FOR TRANSPORT IN THE COMMON
MARKET. Sidcup, Kent, U.K.: Lambarde Press, 1964. (1).

The author of this text describes the progress made, since the inception of the Common Market, and the prospects for the common transport policy now emerging in the Community, demonstrating how this common policy fits into the overall framework of the Community under construction.

201. Despicht, Nigel S. "Transport and the Common Market," ITJ,
Vols. 31 and 32, January 1966, pp. 277-280; March 1966,
pp. 322-326; September 1966, pp. 475-479; and November
1966, pp. 20-26. (1,7b).

A discussion of the role of transportation and the political and economic effects of the transportation policy of the common market.

202. Deutschman, Harold D. and Nathan L. Jaschik. "Income and
Related Transportation and Land-Use Planning Implications,"
HRR, No. 240, 1968, pp. 52-65. (2a,4,6c).

The study indicates that income is a sensitive measure of auto-ownership, transit use, auto and total trip making, and homeownership.

203. Dewdney, John C. "The Daily Journey to Work in County
Durham," TPR, Vol. 31, 1960-61, pp. 107-124. (6).

204. Dial, Robert B. "Transit Pathfinder Algorithm," HRR, No.
205, 1967, pp. 67-85. (2a,5a).

A computer program to find minimum time paths through a large multinodal transportation system.

205. Dickey, John W. and Paul W. Schuldiner. "A Model of the Maximum Generation of Traffic to Planned Shopping Centers," HRR, No. 130, 1966, pp. 44-54. (2b,4,6c).
- A linear programming format is used to calculate the maximum generation rates for three classes of planned centers of various size.
206. Dickey, John W., Frank E. Horten, and Edwin N. Thomas. "Areal Aggregation and Forecasting Precision in Urban Transportation Studies," TESC, Vol. 60, January-February 1969, pp. 60-62. (2a,4,6c).
207. Dickins, Justin H. "New System Developed for Traffic Data Acquisition," TE, Vol. 35, December 1964, pp. 12-15. (9).
- "New (photographic) techniques instituted by Port of New York Authority permit gathering of simultaneous traffic statistics for extensive roadway networks and complex interchange systems."
208. Dickinson, G. C. "The Development of Suburban Road Passenger Transport in Leeds, 1840-95," JTH, Vol. 4, November 1960, pp. 214-224. (3,4,8).
209. Dickinson, Robert E. "The Geography of Commuting in West Germany," AAAG, Vol. 49, December 1959, pp. 443-456. (4,6c).
- Rebuilding industry faster than housing stimulated commuting. The social and economic aspects of commuting are discussed.
210. Dickson, K. B. "Evolution of Seaports in Ghana: 1800-1928," AAAG, Vol. 65, March 1965, pp. 98-111. (7c).
- The survival or disappearance of Ghanaian ports is examined with reference to changes in the speed and direction of Ghana's economic development.
211. Dickson, K. B. "Trade Patterns in Ghana at the Beginning of the Eighteenth Century," GR, Vol. 56, July 1966, pp. 417-430. (3).
212. Dodge, William H. "The Inherent Advantages of Carrier Modes under the National Transportation Policy," LE, Vol. 44, November 1968, pp. 492-502. (8).
- The National Transportation Policy which preserves the "inherent advantages" of each mode of transportation is questioned. While the United States has the best transport system in the world, it is also among the most inefficient.

213. Donanski, Ryszard. "Remarks on Simultaneous and Anisotropic Models of the Transportation Network. Comments by A. J. Scott." PRSA, Vol. 19, 1967, pp. 223-228. (2a,5).

This paper considers the model of a transportation network as a system of edges and capacities as presented by Scott. Unlike Scott's research the author suggests that transportation networks and settlement patterns should be determined simultaneously, as well as the simultaneous determination of the spatial pattern of transportation network complexes consisting of different kinds of transport. Examples of both research approaches are provided.

214. Doxiadis, C. A. "Ekistics and Traffic," TQ, Vol. 17, July 1963, pp. 439-457. (1,4).

Presents the evolution, scale and character of urban growth, describing and ecumenopolis, the settlement of the future and place of traffic in the functions of these future cities.

215. Doxiadis, C. A. "Man's Movement and His Settlements," EKISTICS, Vol. 29, May 1970, pp. 296-321. (1).

216. Drew, Donald R. "Deterministic Aspects of Freeways Operations and Control," HRR, No. 99, 1965, pp. 48-58. (2b).

Congestion is defined quantitatively. Deterministic and probabilistic models of traffic are discussed with emphasis on deterministic models.

217. Drew, Donald R. "Classification and Applications of Traffic Problems by Models," TE, Vol. 36, November 1965, pp. 23-24, and 43. (2b).

Brief treatment of physical and theoretical models, traffic variables, and the example of freeway merging.

218. Drew, Donald R. "Application of Discrete Distributions to Traffic," TE, Vol. 36, December 1965, pp. 24-25. (2b).

Discussion of applying probability distributions to traffic flow.

219. Drew, Donald R. "Application of Continuous Distributions to Traffic," TE, Vol. 36, January 1966, pp. 29-31. (2b).

220. Drew, Donald R. "Application of the Markov Process to Traffic," TE, Vol. 36, March 1966, pp. 50-51. (2b).

221. Drew, Donald R. "The Macroscopic Approach to Traffic Flow," TE, Vol. 36, April 1966, pp. 70-71. (2b).

222. Drew, Donald R. "The Energy-Momentum Concept of Traffic Flow," TE, Vol. 36, June 1966, pp. 52-54. (2b).

Explores correspondence between traffic flow and fluid flow.

223. Drusch, Robert L. "Estimating Annual Average Daily Traffic from Short-Term Traffic Counts," HRR, No. 118, 1966, pp. 85-95. (9).

Traffic counts reported four times a year at stations grouped on the basis of average monthly flows for several consecutive years will yield accurate traffic counts and less cost.

224. Duckham, Baron F. "The Navigation of the Yorkshire Ouse During the Nineteenth Century," JTH, Vol. 6, May 1964, pp. 182-188. (3,8c).

225. Due, John F. "The City of Prineville Railway and the Economic Development of Crook County," EG, Vol. 43, April 1967, pp. 170-181. (7,8a).

Owned by the city of Prineville, the railway stimulated the development of the lumber industry.

226. Dunbar, A. R. "The Control of Public Transport," ITJ, Vol. 31, No. 7, November 1965, pp. 225-233. (8a,8b).

227. Dunne, M. C., R. W. Rothery, and R. B. Potts. "A Discrete Markov Model of Vehicular Traffic," TS, Vol. 2, No. 3, August 1968, pp. 233-251. (2,6).

228. Durden, Dennis and Duane Marble. "The Role of Theory in CBD Planning," JOURNAL OF AMERICAN INSTITUTE OF PLANNERS, Vol. 27, February 1961, pp. 10-16. (2a,4).

The need for theory and the lack of theory available for urban planners are discussed.

229. Dwyer, D. J. "The Development of China's Waterways," G, Vol. 46, 1961, pp. 165-167. (1,8c).

230. Dyckman, John. "Transportation in Cities," SCIENTIFIC AMERICAN, Vol. 213, September 1965, pp. 162-174. (1,4).

231. Eckert, Edward D. "A Concept for Interstate System Rest Areas," HRR, No. 23, 1963, pp. 42-46. (7a).

Criteria for the selection of rest area sites is discussed.

232. Edens, H. J. "Origin and Destination Surveys by Telephone," TE, Vol. 33, April 1963. (9).

233. Edie, L. C., R. S. Foote, Robert Herman, and Richard Rothery. "Analysis of Single-Lane Traffic Flow," TE, Vol. 33, January 1963, pp. 21-27. (2b).

Quantitative treatment of data from Holland Tunnel.

234. Elliott, Timothy S. "Development of Third Level Air Transportation," JOURNAL OF AIR LAW AND COMMERCE, Vol. 29, Summer 1963, pp. 182-204. (8d).

Investigates the problems and prospects associated with the use of light aircraft in scheduled air service to small cities.

235. Ellis, Jack B. and Carlton S. Van Doren. "A Comparative Evaluation of Gravity and System Theory Models for Statewide Recreational Traffic Flow," JRS, Vol. 6, Winter 1966, pp. 57-69. (2b,6b).

The systems theory is considered to have generated more insights, although the gravity model may be suited for small simple systems.

236. Ellis, Raymond H. "Toward Measurement of the Community Consequences of Urban Freeways," HRR, No. 229, 1968, pp. 38-52. (4,7a).

A strategy for measuring the ties between the household site and non-household sites is described.

237. Emmons, D. "Suggestions on the Development of Metropolitan Rapid Transit," HSGTJ, Vol. 1, September 1967, pp. 307-315. (4).

Guidelines for the successful initiation and completion of rapid transit systems are established.

238. Fagin, Henry. "Comprehensive Metropolitan Passenger Planning," HRBB 293, 1961, pp. 32-36. (1,4).

The fundamental philosophy and concepts of comprehensive metropolitan transportation planning as represented by the Penn Jersey Transportation Study are discussed.

239. Fagin, Henry. "The Penn Jersey Transportation Study: The Launching of a Permanent Regional Planning Process," JOURNAL OF AMERICAN INSTITUTE OF PLANNERS, Vol. 29, February 1963, pp. 9-18. (4).

Discusses the policy issues, administrative problems, and research design associated with the Penn Jersey Transportation Study.

240. Falk, Edward L. "Measurement of Community Values: The Spokane Experiment," HRR, No. 229, 1968, pp. 53-64. (4,7a).
- Presentation of a method of measuring community attitudes towards planning proposals.
241. Faltermayer, Edmund K. "The Rail Route to a More Mobile America," FORTUNE, Vol. 74, July 1966, pp. 106-109. (8a).
242. Farmer, Richard N. "Municipal Ownership of Transit Facilities in Smaller Cities," TQ, Vol. 17, January 1963, pp. 57-67. (4).
- Suggests that the present transit financial problem is one of demand and cities find themselves operating transit systems by default of private enterprise.
243. Farmer, Richard N. "The Economics of Congestions," TJ, Vol. 4, Fall 1964, pp. 28-34. (4).
- Costs, problems, and economic solutions to urban traffic congestion.
244. Farmer, Richard N. "Motor Trucking in California," TJ, Vol. 4, Summer 1965, pp. 33-40. (8b).
- "California state law has influenced market structure and economic results."
245. Farris, Martin T. "Rail Mergers: New Interest in an Old Approach," TJ, Vol. 1, Summer 1962, pp. 30-37. (8a).
- Overview of subject.
246. Farris, Martin T. "Transport Regulation and Economic Efficiency," AER, Vol. 59, May 1969, pp. 244-250. (7b).
- Regulatory policies reduce the efficiency of the transportation industry and perpetuates the industry's oligopolistic characteristics. Economists should investigate regulation policy using oligopoly theory.
247. Fearon, Peter. "The Formative Years of the British Aircraft Industry," BUSINESS HISTORY REVIEW, Vol. 43, Winter 1969, pp. 476-495. (3,8d).
- The early growth of the industry depended upon military orders.
248. Fellman, Jerome D. "Emergent Urban Problems of Intercity Motor Transportation," LE, Vol. 27, 1951, pp. 91-101. (4,8b).

249. Ferguson, George A. "Development of Transportation System Alternatives," HRR, No. 148, 1966, pp. 1-8. (1).

Aspects of traffic engineering and resource allocation are discussed with reference to a total framework of transportation planning.

250. Field, Earle. "Some Aspects of Traveling in Stuart England," TQ, Vol. 18, July 1964, pp. 406-420. (3).

251. Fisher, Ronald J. and Arthur B. Sossau. "Census Data as a Source for Urban Transportation Planning," HRR, No. 141, 1966, pp. 47-72. (4,9).

252. Flaherty, Mark C. "Commercial Highway Service Districts and the Interstate: Their Proper Relationship in an Urban Setting," HRR, No. 96, 1965, pp. 8-18. (2a,4,7a).

A method for determining the amount of land that should be made available for highway oriented uses. Differences are noted in land development when planning principles are followed and when they are ignored.

253. Flatt, Allan C. "Effect of Piggyback Operation on Volume of Highway Truck Traffic," HRR, No. 153, 1967, pp. 43-53. (6b,8a,8b).

254. Fleet, Christopher R. and Sydney R. Robertson. "Trip Generation in the Transportation Planning Process," HRR, No. 240, 1968, pp. 11-31. (2b,4,9).

Standard trip generation estimating procedures are evaluated, and it is suggested that well-designed small sample cross-sections and on-site surveys may permit periodic re-evaluations of estimating procedures.

255. Fleischer, Gerald A. "Effect of Highway Improvements on Travel Time of Commercial Vehicles: A Twenty-Five-Year Case Study," HRR, No. 12, 1963, pp. 19-47. (8b).

256. Fleishes, Aaron. "On Prediction and Urban Traffic," PRSA, Vol. 7, 1961, pp. 43-50. (2b,4,6c).

The author of this paper treats the proposition, "if the volume of traffic between two points in a metropolis were predictable, then urban congestion could be relieved and resolved."

257. Fleming, Douglas K. "The Independent Transport Carrier in Ocean Tramp Trades," EG, Vol. 44, January 1968, pp. 21-36. (6a,7c,8c).

The contemporary independent ocean carrier operations in world tramp trades and the interplay of economics and geography characterizing these operations.

258. Fletcher, Daniel O. "Decline of the Great Lakes Package-Freight Carrier," BUSINESS HISTORY REVIEW, Vol. 36, Winter 1962, pp. 387-407. (8c).

The disappearance of the package-freight carrier is considered a consequence of several economic factors which caused large-scale changes in Great Lakes shipping.

259. Fockema, Andrae F. J. "The Canal Communications of Central Holland," JTH, Vol. 4, May 1960, pp. 174-179. (3,6b,8c).

Describes the conflict of interest between requirements of effective flood defense and of waterborne traffic and states that vested interests at the time of the Netherlands unification permitted only partial improvements to the canal system.

260. Forbes, T. W. "Human Factor Considerations in Traffic Flow Theory," HRR, No. 15, 1963, pp. 60-66. (2b).

The expectation of congestion, poor visibility, and the psychological squeezing of lane width caused by an adjacent wall influence an individual's behavior in traffic. The effect of these factors on traffic flow is expressed mathematically.

261. Forward, C. N. "Recent Changes in the Form and Function of the Port of St. John's Newfoundland," CG, Vol. 11, No. 2, 1967, pp. 101-116. (7c).

Traces the changes in the port's water front land use, commodity trade, and vessel traffic in the context of economic development.

262. Foster, R. T. "Pipeline Development in the United Kingdom," G, Vol. 54, April 1969, pp. 204-211. (5,8e).

Maps and review.

263. Franklin, William D. "The Highway 'Interchange Complex' and Economic Development," TQ, Vol. 24, January 1970, pp. 77-91. (7a,7b).

264. Frederick, Joseph C. "Aesthetic Considerations in Urban Arterial Route Planning," HRR, No. 23, 1963, pp. 22-38. (4,5b).

265. French, Alexander. "Highway Ton-Miles," HRR, No. 82, 1965, pp. 77-93. (6b,8b).

The procedures for estimating highway ton-miles, problems in such analysis, and a comparison of highway ton-miles with similar values for other modes of transportation.

266. Frey, J. C., H. K. Dansereau, R. D. Pashek, and A. Twark. "Land-Use Planning and the Interchange Community," HRBB 327, 1962, pp. 56-66. (4).

267. Fulton, Maurice and L. C. Hoch. "Transportation Factors Affecting Locational Decisions," EG, Vol. 35, January 1959, pp. 51-59. (2a,7).

A general discussion of the role of transportation as a locational determinant. Freight rates and the quality of transport service are considered interdependent variables within the entire framework of production and marketing objectives.

268. Gakenheimer, Ralph A. "Planning, Transportation, and the Small City," TQ, Vol. 18, April 1964, pp. 282-295. (4).

Treatment of aspects unique to the small city.

269. Gakenheimer, Ralph A. "High Speed Transit in Urban Areas," HSGTJ, Vol. 1, January 1967, pp. 22-31. (4).

General discussion of the impact of high speed transit in urban areas, emphasizing the technological demands of such systems and the requirements they will exert on the management of urban centers.

270. Gakenheimer, Ralph A. "Social Factors in Planning Urban Transportation," HSGTJ, Vol. 2, September 1968, pp. 400-408. (4).

Considers transport problems associated with low-income families.

271. Ganz, Alexander. "Emerging Patterns of Urban Growth and Travel," HRR, No. 229, 1968, pp. 21-37. (4,6c,7a).

The trend towards dispersal of travel away from the central city is discussed with reference to land use, travel patterns, and mode of travel.

272. Garrison, William L. and Duane F. Marble. "Analysis of Highway Networks: A Linear Programming Formulation," HIGHWAY RESEARCH BOARD PROCEEDINGS, No. 37, 1958, pp. 1-14. (2a,5,8b).

273. Garrison, William L. and Marion E. Marts. GEOGRAPHIC IMPACT OF HIGHWAY IMPROVEMENT. Seattle, Washington: University of Washington, 1958. (2,7a).

This study is an attempt to measure the effects of the re-alignment and improvement of U. S. Highway 99 in the vicinity of Marysville, Washington. It is intended to complement the majority of highway "impact" studies by presenting results in great detail for a single case. Whereas the majority of studies have dealt with a relatively few selected indicators, this study makes use of many different indicators of effects and presents hundreds of separate combinations and comparisons of data.

274. Garrison, William L. "Spatial Structure of the Economy: I," AAG, Vol. 49, June 1959, pp. 232-239. (1,2a).

Review of six books which examine the spatial pattern of economic activity. Economic insights are used to construct patterns which in turn may be interpreted by geographic insights.

275. Garrison, William L. "Spatial Structure of the Economy: II," AAG, Vol. 49, December 1959, pp. 471-482. (1,2a).

Examines the uses of linear programming, summarizing the structure and accomplishments of five models.

276. Garrison, William L. STUDIES OF HIGHWAY DEVELOPMENT AND GEOGRAPHIC CHANGE. Seattle, Washington: University of Washington Press, 1959. (2,7a).

This volume presents findings of investigations of the spatial pattern of shopping centers in their relation to highway improvements, relationships between highway travel and residential and commercial site selection, and the utilization of highway transportation in relation to the arrangement of customer tributary areas and supplying centers at local, regional and national levels.

277. Garrison, William L. "Connectivity of the Interstate Highway System," PRSA, Vol. 6, 1960, pp. 121-137. (2, 5a, 5a, 5b).

An introduction to the analysis of the transportation networks and some descriptive approaches via graph theory. A comparative analysis between the railway and interstate highway networks reveals that despite the sprawling character of the Interstate System, certain places on the network are emphasized more than central places on the railroad network.

278. Garrison, William L. "Supply and Demand for Land at Highway Interchange," HRBB 288, 1961, pp. 61-66. (7a).

Problems of estimating long term land use patterns arise from increased demand for traffic intensive land uses and lack of pertinent price information. Temporal and regional inter-relationships affecting land usages are not adequately understood.

279. Garrison, William L. "Intra- and Interurban Transportation Networks," in F. Pitts, editor. URBAN SYSTEMS AND ECONOMIC DEVELOPMENT. Eugene, Oregon: University of Oregon, School of Business Administration, 1962, pp. 28-38. (2a,5,7b).

Focuses on the relationship between spatial features of economic development and transportation networks and points up "the need for criteria to guide decisions about transportation networks."

280. Garrison, William L. and Duane F. Marble. "Factor-Analytic Study of the Connectivity of a Transportation Network," PRSA, Vol. 12, 1964, pp. 231-238. (2,5a).

In this research on the structure of a transportation network, the connection matrix of the Venezuelan air transport system is subjected to factor analysis. The authors conclude that structure of transportation networks may be explained largely on the basis of neighborhood and regionalization effects.

281. Garrison, William L. and Duane F. Marble. "Urban Transportation Planning Models in 1975," JOURNAL OF AMERICAN INSTITUTE OF PLANNERS, Vol. 31, 1965, pp. 156-158. (1,4).

282. Garrison, William L. A PROLEGOMENON TO THE FORECASTING OF TRANSPORTATION DEVELOPMENT. Evanston, Illinois: The Transportation Center, Northwestern University, 1965. (2a,5).

283. Garrison, William L. "Urban Transportation Studies," in PAPERS ON REGIONAL STATISTICAL STUDIES, Sylvia Ostry and T. K. Rymes, editors. Toronto, Canada: University of Toronto Press, 1966, pp. 1-13. (1,4).

Review, comments, and suggested future research directions, emphasizing a system approach.

284. Gauthier, Howard L. "Transportation and the Growth of the Sao Paulo Economy," JRS, Vol. 8, Summer 1968, pp. 77-94. (2a,5a,7b).

Valued graph-theoretic measures and canonical analysis are used to examine the relationship between the development of a transportation system and the spatial pattern of urban economic growth.

285. Gauthier, Howard L. "Geography, Transportation, and Regional Development," EG, Vol. 46, October 1970, pp. 612-619. (2a,7b).

A review of ways of viewing transportation in the development process, arguing for the necessity of considering transportation as a spatial system in regional development and suggesting some problems that arise in attempting to relate the spatial impact of transportation to goals of regional intergration.

286. George, Stephen, Jr. "Transportation System Development and Evaluation as Practiced in Seattle," HRR, No. 238, 1968, pp. 116-120. (4).

287. Gern, R. C. and H. R. Joyner. "Crossroute Access Design in Interchange Areas," HRR, No. 59, 1964, pp. 1-8. (2a,5a).

Equations which aid in determining proper spacing between interchange ramp terminals and crossroute access points are developed for avoiding congestion.

288. Getis, Arthur. "Residential Location and the Journey from Work," PROCEEDINGS, A. A. G., Vol. 1, 1969, pp. 55-59. (2a,4,6c).

This paper questions the concept that the CBD is the control point of the city and instead views the city as having several work foci. A probability model is used to describe frequency of work trips by distance from work places.

289. Gilpin, Margaret C. "Møre and Romsdal, Norway: A Study in the Rural Transport System of a Coastal Area," G, Vol. 53, April 1968, pp. 145-162. (1).

290. Ginsburg, Norton. "China's Railway Network," GR, Vol. 41, July 1951, pp. 470-474. (5,8a).

291. Glejser, H. and A. Dramais. "A Gravity Model of Inter-dependent Equations to Estimate Flow Creation and Diversion," JRS, Vol. 9, December 1969, pp. 439-450. (2b,4,6c).

Negative and positive interdependence are accounted for in the gravity model framework. The results of testing indicate sociological barriers to be an important obstacle to population flows.

292. Goldin, Kenneth D. "Three Aspects of Highway Efficiency: Amount, Quality, and Price," JTEP, Vol. 2, September 1968, pp. 349-366. (2a,5a).

"A study of efficient pricing of an efficient highway capacity, taking into consideration peaked and stochastic demand and users' diversity of preferences for quality."

293. Goldman, Thomas. "Efficient Transportation and Industrial Location," PRSA, Vol. 4, 1958, pp. 91-106. (7).

294. Goldstein, Sidney. "Nonuser Benefits from Highways," HRR, No. 20, 1963, pp. 162-181. (7a).

An economy wide discussion of the concept of non-user benefits. The results of numerous impact studies are synthesized and efforts to quantify non-user benefits are delineated.

295. Goldstein, Sidney and Kurt Mayer. "Migration and the Journey to Work," SOCIAL FORCES, Vol. 42, May 1964, pp. 472-481. (4,6).

296. Gollidge, R. G. "Some Notes on the Effect of Road Competition on the Transportation of Certain Commodities in Northern New South Wales," AUSTRALIAN GEOGRAPHER, Vol. 8, 1961, pp. 116-118. (8).

A comparison of railroad "bulk loading" rates with shipment rates for roads. Discusses the means by which railroads maintain their competitive position despite rate differences with roads.

297. Gollidge, R. G. "A Geographical Analysis of Newcastle's Rail Freight Traffic," EG, Vol. 39, January 1963, pp. 60-73. (4,6b,8a).

An analysis of Newcastle's development as a leading freight terminal, the direction and force of inter-action, originating and terminating traffic, and rail traffic regions in northern New South Wales.

298. Goodwin, Allan. "Attitudes and Shopper Mobility in a Small City," HRR, No. 233, 1968, pp. 16-26. (4,6c).

Like shopper attitudes in large cities, shoppers in smaller cities also considered parking as the most important disadvantage to a CBD shopping trip. Small city CBD shoppers tended to be in low or high income groups and older than suburban shoppers.

299. Goodwin, Crawford D. "Economists and Railways in Colonial Australia," JTH, Vol. 6, November 1963, pp. 65-86. (3,6b,7b,8a).

Presentation of reactions of writers on railways in colonial Australia.

300. Gorizontov, B. B. and S. S. Tsenin. "Problems in the Geography of Economic-Transport Links of the World Socialist System," SGRT, Vol. 6, January 1965, pp. 25-28. (8a).

Outlines some of the major needs of future transport in the Socialist world and suggests steps for strengthening the rail sector of the transport system.

301. Goss, R. O. "Towards an Economic Appraisal of Port Investments," JTEP, Vol. 1, September 1967, pp. 249-272. (7c).

Problems of port investment techniques, pricing systems, and cost-benefit analysis.

302. Gottfeld, Gunther M. "Rapid Transit Expansion in Stockholm, Sweden," TQ, Vol. 18, October 1964, pp. 576-588. (4,5c, 8f).

303. Gould, Peter R. and Robert H. T. Smith. "Method in Commodity Flow Studies," AUSTRALIAN GEOGRAPHER, Vol. 8, 1961, pp. 73-77. (1,2a,6).

Describes a technique for mapping deviations from a least-squares regression line to identify pertinent questions for subsequent field work.

304. Gould, Peter R. and Robert H. T. Smith. "Transportation in Africa," GR, Vol. 53, October 1963, pp. 599-600. (1).

305. Graham, E. F. "Application of Large Network Traffic Assignments to Small Area Route Location Studies," HRR, No. 114, 1966, pp. 8-19. (2a,4,5b).

By reducing the size of the area used for the distribution of trips, assignment of traffic to alternate routes is accomplished and the location of individual segments of a total freeway system is possible.

306. Grecco, W. L. and S. M. Breuning. "Application of Systems Engineering Methods to Traffic Forecasting," HRRB 347, 1962, pp. 10-23. (2b,4,6c).

The principals of linear graph theory and the requirements for using these methods are discussed. The techniques of systems engineering are compared with the gravity model and the electrostatic model to estimate work trips in a hypothetical community.

307. Grecco, W. L. and S. M. Breuning. "A Systems Engineering Model for Trip Generation and Distribution," HRR, No. 38, 1963, pp. 124-146. (2b,4,6c).

Linear graph theory can be used to find a systems solution for trip distribution problems. The components of a systems engineering approach are emphasized. The study indicates system engineering models encourage a more precise definition of parameters and their interaction.

308. Green, F. H. W. "Bus Service in the British Isles," GR, Vol. 41, October 1951, pp. 645-655. (8b).

309. Green, F. H. W. "Community of Interest Areas in Western Europe--Some Geographical Aspects of Local Passenger Traffic," EG, Vol. 29, October 1953, pp. 283-298. (4,8).

A discussion of the hinterland relationships of urban places in Western Europe; bus service is used to delimit hinterlands.

310. Green, Mark K. "Multiple Screenline Study to Determine Statewide Traffic Patterns," HRBB 253, 1960, pp. 139-144. (9).

A report on the methodology of screenline surveys.

311. Griffiths, I. L. "The Daily Movement to Work of Anthracite Miners in South Wales," TEGS, Vol. 53, August-September 1962, pp. 184-189. (4,6).

312. Grossman, David A. and Melvin R. Levin. "Area Development and Highway Transportation," HRR, No. 16, 1963, pp. 24-31. (7a).

Examination of the effects of highways on areas of economic distress or redevelopment and the implications of the location and the construction schedules of the Interstate Highway System on several distressed areas of the United States.

313. Grotewold, Andreas and Lois Grotewold. "Some Geographic Aspects of International Trade," EG, Vol. 33, July 1957, pp. 257-266. (6a).

Presents some basic generalizations about international trade by examining the size and distribution of trade areas, commodity composition, and the direction of the trade.

314. Grotewold, Andreas. "Von Thunen in Retrospect," EG, Vol. 30, October 1959, pp. 346-355. (2a,7).

An explanation and defense of Von Thunen's theory of the location of agricultural production. The development of modern transportation and the changing tastes of city dwellers are considered as two basic reasons for deviations from the theoretical land use pattern around American and European cities.

315. Grotewold, Andreas. "Some Aspects of the Geography of International Trade," EG, Vol. 37, October 1961, pp. 309-319. (6a).

316. Guest, Ross B. "The Growth of Soviet Air Cargo," JG, Vol. 65, October 1966, pp. 323-327. (8d).

Air freight, mail, and express traffic has increased rapidly but still accounts for only a small per cent of the Soviet Union's total freight traffic.

317. Guttenberg, Albert Z. "Urban Structure and Urban Growth," JOURNAL OF AMERICAN INSTITUTE OF PLANNERS, Vol. 26, May 1960, pp. 104-110. (7).

The elements of structure are identified, the mutual influences of urban structure and urban growth are considered, and the dynamic interdependency of various urban structural phenomena are demonstrated by analyzing the effects of a change in transportation efficiency.

318. Guyton, John W. and W. S. Pollard, Jr. "Corridor Analysis of Travel Desires as Utilized in Major Street Planning," HRBB 347, 1962, pp. 222-253. (4).

The use of desire charts as an aid in street and highway planning for urban areas.

319. Haas, R. C. G. and J. F. Morrall. "Analysis of Pedestrian Circulation through a Tunnel Network," TQ, Vol. 21, April 1967, pp. 229-235. (2a,6c).

A study of pedestrians within a university to provide future design criteria.

320. Hadden, Jeffrey K. "The Use of Public Transportation in Milwaukee, Wisconsin," TQ, Vol. 18, April 1964, pp. 219-232. (4,8f).

Determines variables important in predicting use of public transit: age of area of city, density, distance from CBD, and socioeconomic status.

321. Haggett, Peter. "Networks," *LOCATIONAL ANALYSIS IN HUMAN GEOGRAPHY*. New York, New York: St. Martin's Press, 1966, pp. 61-86. (5).

This chapter focuses on a discussion of the location of routes, density pattern of route networks, and models of network change. The writing depends heavily upon empirical research of other authors for purposes of illustrations.

322. Haggett, Peter. "Network Models in Geography," in Richard J. Chorley and Peter Haggett, editors, *MODELS IN GEOGRAPHY*. London, England: Methuen and Company, Ch. 15, 1967, pp. 609-668. (5).

Treatment of a linear feature, such as rivers, railways, and polygons from a geometrical viewpoint. Models of increasing complexity are described, from the single path to the cellular network.

323. Haggett, Peter. "An Extension of the Horton Combinatorial Model in Regional Highway Networks," JRS, Vol. 7, Winter 1967, (supplement), pp. 281-290. (5a).

The combinatorial ordering system is extended to highway networks and may be integrated within more general statements of central place systems. Branching ratios may be of value in designing networks to meet loadings at peak-hours.

324. Haggett, Peter and Richard J. Chorley. *NETWORK ANALYSIS IN GEOGRAPHY*. New York, New York: St. Martin's Press, 1969. (5).

Part I, "Spatial Structures," discusses ways of describing networks in both topologic and geometric terms and introduces the role of graph theory in geographic analysis; Part II, "Evaluation of Structures," sets the spatial structure of networks against their primal and dual roles--as conductors of, and barriers to, flows. Part III, "Structural Change," traces the patterns of network evolution and attempts to build projective growth models through simulation and related techniques.

325. Haight, Frank A. "The Future of Traffic Flow Theory," TQ, Vol. 17, November 1963, pp. 516-527. (2b,6).

Since traffic flow theory is incomplete, it should be expanded with probability and statistical models tying in with traffic engineering and applied mathematics.

326. Haikalis, George and Hyman Joseph. "Economic Evaluation of Traffic Networks," HRBB 306, 1961, pp. 39-63. (5b).

Four alternate traffic systems are compared to select the least cost plan. Total travel costs for users and total capital requirements are two criteria used for comparisons.

327. Haley, Charles E., Edward M. Hall, and Arnold A. Johnson. "Travel Time--A Measure of Service and a Criterion for Improvement Priorities," HRR, No. 35, 1963, pp. 1-17. (4,5).

Presentation of a priority formula to aid in determining major street construction priorities in urban areas. Travel time is used as a measure of the level of traffic service and as the basic criterion for the priority formula.

328. Hall, Peter. "Transportation," US, Vol. 6, November 1969, pp. 408-435. (1,4,7a).

A general discussion of the influence of intra- and interurban transportation on urban form.

329. Hamburg, John R., Charles R. Guinn, George T. Lathrop and George C. Hemmens. "Linear Programming Test of Journey-to-Work Minimization," HRR, No. 102, 1965, pp. 67-75. (2b,4,6c).

The degree of influence of the journey-to-work trip on residential location is analyzed. It is concluded that people are not indifferent to time of travel, but do not locate to minimize travel time. Higher time indifference rates were associated with upper socioeconomic groups.

330. Hamilton, Calvin S. "The Development of a Land-Use Data Bank for Transportation Planning," HRR, No. 64, 1964, pp. 84-99. (4,9).

Different levels of data collection necessary for transportation planning are discussed with reference to the Pittsburgh Area Transportation Survey. Types of land use at the city-block level are presented and their role in simulation studies is presented.

331. Hamilton, C. W. "Mathematical Research in Traffic Flow," HSGTJ, Vol. 1, September 1967, pp. 339-346. (2b).

Discusses the approaches to the modeling of traffic flow problems, specifically the relation of road traffic, hydrodynamic analogies, and traffic dynamics.
332. Hammond, Harold F. "The New Age of Transportation Coordination," TQ, Vol. 21, October 1967, pp. 501-519. (1).
333. Hampton, P. "Empirical Evidence on the Determinants of Interregional Trade Flows," ECONOMIC DEVELOPMENT AND CULTURAL CHANGE, Vol. 18, October 1969, pp. 34-39. (6b).

Regression analysis of commodity flows in New Zealand's manufacturing industries.
334. Hance, William A. "Transportation in Madagascar," GR, Vol. 48, January 1958, pp. 45-68. (1,8).

Madagascar's roads, rail, air, and port systems are described and compared with the transport systems of African countries.
335. Hancock, Macklin L. "Transportation and Organic Urban Design," TQ, Vol. 17, January 1963, pp. 5-23. (4).

Develops a hypothesis for urban design to link effective handling of traffic with the design of communities.
336. Hand, Irving and C. Dwight Hixon. "Planning, Traffic and Transportation in Metropolitan Areas," TQ, Vol. 17, April 1963, pp. 254-271. (4).

Describes the goals and programs of the Nashville Metropolitan Area Transportation Survey.
337. Haning, Charles R. and C. V. Wootan. "Value of Commercial Motor Vehicle Time Saved," HRR, No. 82, 1965, pp. 54-76. (8b).

The possibilities of determining reliable estimates of the dollar value of time savings occurring from the use of improved highway facilities are examined. Operating costs for commercial trucks are established, and time costs are estimated for each commercial truck category.
338. Hansen, Walter G. "How Accessibility Shapes Land Use," JOURNAL OF AMERICAN INSTITUTE OF PLANNERS, Vol. 25, May 1959, pp. 73-76. (2a,4,7).

339. Hansen, Walter G. "Land Use Forecasting for Transportation Planning," HRBB 253, 1960, pp. 145-151. (2a).

Discussion of a land use forecasting procedure, a review of the over-all transportation planning process, and a presentation of a land use model based on accessibility and vacant developable land.

340. Hansen, Walter G. "Evaluation of Gravity Model Trip Distribution Procedures," HRBB 347, 1962, pp. 67-76. (2b,4,6c).

The gravity model is tested and fit to Washington, D.C., O-D survey data, and it is shown that the basic gravity model formulation can serve as a framework for forecasting urban traffic flows.

341. Hanson, Perry. "Movement Fields: A Viable Surrogate for Communication Fields," RESEARCH REPORT No. 59, Evanston, Illinois: Northwestern University, Department of Geography, 1970. (2,6).

The paper presents an empirical exploration of the relationship between individual travel patterns and individual communication patterns using a sample, rural Korean population. The relationship between a household's daily, recurrent travel patterns and its information field is evident since the former is defined as the spatial point set where face-to-face interpersonal contacts can occur, and the latter actually defines the subset of locations where contacts occur.

342. Hanson, Philip. "Soviet Inland Waterways," JTH, Vol. 6, May 1963, pp. 3-13. (3,8c).

A note on the past and present role of Soviet inland water transport.

343. Harbeson, Robert W. "Diversification and Transport Investment," LE, Vol. 46, February 1970, pp. 12-21. (8a).

Discusses the diversification of railroad corporations and the organization of holding companies by railroads.

344. Harmelink, M. D., G. C. Harper, and H. M. Edwards. "Trip Production and Attraction Characteristics in Small Cities," HRR, No. 205, 1967, pp. 1-19. (2b,4,6c).

The study indicates the most reliable prediction of trip production to be car ownership. The accuracy of trip estimation decreased with increased segregation of trip purpose. Trip attraction is related to land use characteristics of each zone.

345. Harper, B. C. S. and H. M. Edwards. "Generation of Person Trips by Areas within the Central Business District," HRBB 253, 1960, pp. 44-61. (2a,4,6c).

Regression analysis indicates a positive relationship between floor space in use and travel to zones within the CBD.

346. Harr, Charles M. "Transportation and Economic Opportunity," TQ, Vol. 21, October 1967, pp. 521-526. (1,4,7b).

A brief statement within the urban context.

347. Harris, Britton. "Experiments in Projection of Transportation and Land Use," TQ, Vol. 16, April 1962, pp. 305-319. (2,4).

The article describes briefly some of the more experimental techniques for analyzing problems of the Philadelphia-Camden-Trenton metropolitan region.

348. Hart, Alan S. "Evolution of the Sacramento Freeway System," TQ, Vol. 17, November 1963, pp. 557-572. (5,8b).

Discusses the decision-making process in determining which would be the best master plan for a freeway system.

349. Hart, Harold W. "The Sedan Chair as a Means of Public Conveyance," JTH, Vol. 5, November 1962, pp. 205-218. (1,3).

350. Harvey, Thomas N. "A Method of Network Evaluation Using the Output of the Traffic Assignment Process," HRR, No. 238, 1968, pp. 46-63. (2a,4,5c).

Consumer surplus is used as a measure of benefit for comparing benefits and losses from a particular network change. Fixed travel demand need not be assumed and only interzonal volumes and interzonal separations for the networks investigated are required.

351. Hawrey, Philip E. "On the Choice of Forecasting Models for Air Travel," JRS, Vol. 9, August 1969, pp. 215-224. (2b,6b,8d).

The gravity model and abstract mode model are compared. The export predictions of the gravity model are considered superior to the abstract mode model.

352. Hay, George A., Edward K. Morlok, and Abraham Charnes. "Toward Optimal Planning of a Two-Mode Urban Transportation System: A Linear Programming Formulation," HRR, No. 148, 1966, pp. 20-48. (2a,4,8f).

Linear programming is used to establish optimum transportation service for automobile transport facilities and mass transit facilities in a radial, downtown oriented corridor. The objective is to find what combination minimizes capital and operating costs of transit and auto transport during the design year.

353. Haynes, John J. "Some Considerations of Vehicular Density on Urban Freeways," HRR, No. 99, 1965, pp. 59-80. (2b,4,6c).

In uncongested conditions frequency distributions of densities are closely approximated by the Poisson distribution.

354. Healy, Kent T. "The Merger Movement in Transportation," AER, Vol. 52, May 1962, pp. 436-444. (8a).

An evaluation of mergers, questioning the benefits of expected elimination of parallel routes and terminal facilities.

355. Heanue, Kevin E., Lamelle B. Hamner, and Rose M. Hall. "Adequacy of Clustered Home Interview Sampling for Calibrating a Gravity Model Trip Distribution Formula," HRR, No. 88, 1965, pp. 116-136. (2b,4,6c,9).

Gravity model trip distributions over larger trip volumes are not significantly different from O-D survey data. While clustered sampling provides stable trip volumes, it does not provide for adequate data for calibration as the sample is biased by the location of sampling zones.

356. Heanue, Kevin E. and Clyde E. Pyers. "A Comparative Evaluation of Trip Distribution Procedures," HRR, No. 114, 1966, pp. 20-50. (2b,4,6c).

The Fratar, gravity, intervening opportunities, and competing opportunities models are comparatively evaluated. The Fratar model is accurate for areas of stabilized land-use patterns, and the unadjusted intervening opportunities model more accurately simulates travel patterns than an unadjusted gravity model.

357. Heier, John J. and David M. Glancy. "Modern Expressways and Public Transportation," TQ, Vol. 17, January 1963, pp. 124-132. (4).

Presents the "balanced system" which is the efficient movement of people and goods between desired points; also the writer approaches the suitability of various forms of public transportation to assist in providing adequate circulation.

358. Heitmeyer, Roderick. "Some Available Traffic Forecasts and the Potential Demand for Commercial Supersonic Aircraft," JOURNAL OF AIR LAW AND COMMERCE, Vol. 28, Spring 1961-62, pp. 153-171. (8d).

359. Helin, Ronald A. "Finland Regains an Outlet to the Sea," GR, Vol. 58, April 1968, pp. 167-194. (3,8c).

A description of the genesis and the functions of the Saimaa Canal.

360. Henderson, Arthur. "European and North American Traffic, Engineering and Design," TQ, Vol. 16, November 1962, pp. 510-520. (1,6).

A simple comparison of driving and traffic characteristics.

361. Hendrix, Frank L. "Federal Transportation Statistics: An Analysis," TJ, Vol. 5, Fall 1965, pp. 5-15. (9).

362. Herbert, Budd and Richard Runyan. "The 1963 Census of Transportation: Review and Prospects," PG, Vol. 19, September 1967, pp. 268-271. (9).

Due to a lack of utilization of the 1963 Census of Transportation, this paper is written with the purpose of bridging the communications gap between potential users and the publishers of the data. The major part of the paper focuses on each of the surveys conducted by the Bureau of the Census, highlighting a few generalizations. A second section suggests areas of use and also offers criticisms for improvement of any future census of transportation.

363. Herr, Phillip B. "The Timing of Highway Impact," TQ, Vol. 16, April 1962, pp. 279-288. (7a).

Impact usually began before the facility was in service, surged to a peak shortly after its opening, then fell to a lower level in the next few years.

364. Herring, Frank W. "Metropolitan Growth and Metropolitan Travel Patterns," HRBB 293, 1961, pp. 9-20. (4,6c).

A description of metropolitan growth in the New York metropolitan region focusing on changing patterns of travel behavior in response to metropolitan growth.

365. Heymann, Hans, Jr. "Air Transport and Economic Development: Some Comments on Foreign Aid Programs," AER, Vol. 52, May 1962, pp. 386-395. (7,8d).

General discussion of the importance of air transport to underdeveloped countries.

366. Hickey, Joseph E., Jr. "A Scenic Approach to Scenic Road-building," TQ, Vol. 19, November 1965, pp. 578-593. (5b).

The role of aesthetics in route selection.

367. Hill, Donald M. and Norman Dodd. "Travel Mode Split in Assignment Programs," HRBB 347, 1962, pp. 290-301. (2b, 4,6c).

A mathematical model used for trip prediction in Toronto, Canada.

368. Hill, Donald M. and H. G. Von Cube. "Development of a Model for Forecasting Travel Mode Choice in Urban Areas," HRR, No. 38, 1963, pp. 78-96. (2b,4,6c).

Travel mode choice behavior for trips to work is related to travel time, travel cost, the status of trip makers, and the level of convenience associated with each mode.

369. Hill, Donald M. and Norman Dodd. "Studies of Trends of Travel between 1954 and 1964 in a Large Metropolitan Area," HRR, No. 141, 1966, pp. 1-23. (2a,4,6c).

A comparative analysis indicates to what extent the travel characteristics used in a traffic prediction model have changed. The motive, time, duration, and method of travel are discussed. It is concluded that there is an overall stability between person trips and the reasons for travel, that trip length is not significantly different, and that public transport preferences are similar.

370. Hille, Stanley J. and Theodore K. Martin. "Consumer Preference in Transportation," HRR, No. 197, 1967, pp. 36-43. (2a,4,6c).

The consumer's concept of the ideal transportation system is identified using factor analysis. While there is some variation by trip purpose, cost and time factors are not considered as important as reliability of destination achievement.

371. Hilling, David. "Tema: The Geography of a New Port," G, Vol. 51, 1966, pp. 111-125. (7c).

A description of Tema's site, construction, trade structure, hinterland, industries, and significance to West Africa.

372. Hilton, George W. "Decline of Railroad Commutation," BUSINESS HISTORY REVIEW, Vol. 36, Summer 1962, pp. 171-187. (4,8a).

An examination of the economic factors responsible for the decline in railroad commuter traffic and of recent policy issues which indicate further decline and possible extinction of commuter traffic.

373. Hilton, George W. "Rail Transit and the Pattern of Modern Cities: The California Case," TQ, Vol. 21, July 1967, pp. 379-393. (4,6c,7,8a).

A study of the relations "between the geographical pattern, the technology of urban transportation, and the other forces at work on the form of American cities," with emphasis on San Francisco and Los Angeles.

374. Hixon, Dwight C. "An Analysis of Urban Travel Times and Traffic Volume Characteristics," HRBB 303, 1961, pp. 103-116. (2a,4,6c).

Travel time is used as a basis for comparing the level of traffic service on arterial routes in the Nashville, Tennessee, metropolitan area.

375. Hoch, Irving. "Benefit-Cost Methods for Evaluating Expressway Construction," TQ, Vol. 15, April 1961, pp. 208-225. (7,8b).

"Outlines some general procedures for calculating benefits and costs of expressways construction."

376. Hoel, Lester A. "Truck Travel in the Los Angeles Metropolitan Area," TQ, Vol. 18, October 1964, pp. 535-553. (4,6c,8b).

Presents O-D data on commodity movement.

377. Hoel, Lester A. "Considerations Affecting the Choice of Urban Transportation Systems," TE, Vol. 37, May 1967, pp. 36-40. (1,4).

A general discussion, calling for more research as an aid for planning.

378. Hoel, Lester A. "Pedestrian Travel Rates in Central Business Districts," TE, Vol. 38, January 1968, pp. 10-13. (4,6c).

Factors affecting pedestrian travel include time of day, external influences, temperature, sex, trip purpose, and socioeconomic status.

379. Hoffman, George A. "Minimizing Land Used by Automobiles and Buses in Urban Central Core: Underground Highways and Parking Facilities," HRR, No. 102, 1965, pp. 98-114. (4).

A study of design features of tunnel construction costs and the comparison of tunnel costs, compared to the cost of surface routes, indicates that by the turn of the century it may be cheaper to move and park cars and buses underground in the center of many American cities.

380. Holmes, J. H. "The Suburbanization of Cessnock Coalfield Towns: 1954-1964," AUSTRALIAN GEOGRAPHICAL STUDIES, Vol. 3, October 1964, pp. 105-128. (4,6).

Examines community changes with changes in the coalfield economy.

381. Holmes, Jerold M. "The Pan American Highway," JG, Vol. 62, April 1963, pp. 145-151. (1,8b).

382. Holzner, Lutz. "The Rhine-Main-Danube Waterhighway," JG, Vol. 65, September 1966, pp. 270-284. (3,8c).

Discusses the history and impact of a canal link joining the Main River and the Danube River.

383. Hooson, David J.M. "The Middle Volga: An Emerging Focal Region in the Soviet Union," GEOGRAPHICAL JOURNAL, Vol. 126, June 1960, pp. 180-189. (8c).

The middle Volga region will continue in industrial growth, as it is near established population centers and has improved transport lines with all parts of the nation.

384. Hoover, Edgar M. "Motor Metropolis: Some Observations on Urban Transportation in America," JOURNAL OF INDUSTRIAL ECONOMICS, Vol. 13, June 1965, pp. 177-192. (1,4).

The relationship between the use of private automobiles and the economic and social problems associated with urban expansion.

385. Hoover, Robert. "Policy Growth and Transportation Planning in the Detroit Metropolitan Area," PRSA, Vol. 7, 1961, pp. 223-240. (4).

The author presents an historical sketch of the development of transportation in the Detroit area and emphasizes, by way of the Detroit example, that planning is a function which proceeds according to certain definite growth stages.

386. Horn, John W., P. D. Cribbons, J. D. Blackburn, and C. E. Vick, Jr. "Effects of Commercial Roadside Development on Traffic Flow in North Carolina," HRBB 303, 1961, pp. 76-93. (2a,6,7a).

Average car and maximum car methods are used to gather data used to construct models indicating the association between traffic flow characteristics and business types along the route.

387. Horn, John W. "Impact of Industrial Development on Traffic Generation in Rural Areas of North Carolina," HRBB 347, 1962, pp. 133-142. (6).

A report of a survey investigating and interpreting the characteristics of traffic generated in open rural areas and traffic generated by manufacturing industries.

388. Horn, R. William. "Air Cargo Ton-Miles--A Statistic of Growing Importance," HRR, No. 82, 1965, pp. 94-99. (8d,9).

The growth of cargo traffic is discussed. The CAB and ATA data collection procedures and data categories are evaluated.

389. Horton, Frank E. and Paul W. Shuldiner. "The Analysis of Land-Use Linkages," HRR, No. 165, 1967, pp. 96-107. (2a,4,6c).

The Markov chain model is used to describe linkages among land use and activities.

390. Horton, Frank E. "The Utility of Trip Forecasting Models Based on Aggregate Land Use Data," PG, Vol. 19, November 1967, pp. 319-322. (2a,4).

"The problem posed here is the extent to which division or aggregation of land use groups, both areally and by type, affect the accuracy of travel forecasts."

391. Horton, Frank E. GEOGRAPHIC STUDIES OF URBAN TRANSPORTATION AND NETWORK ANALYSIS. Department of Geography, Studies in Geography No. 16, Evanston, Illinois, Northwestern University Press, 1968. (4,5).

Six papers are presented in this volume, four of which are reports of research and explorations into aspects of urban transportation, and the remaining two are concerned with applications of graph theory to network analysis. The papers vary widely in viewpoint, but they share a common focus in striving toward the development and application of theory in transportation geography.

392. Horton, Frank E. "Location Factors as Determinants of Consumer Attraction to Retail Firms," AAAG, Vol. 58, December 1968, pp. 787-801. (2a,4).

"Spatial variability in consumer attraction to retail firms may be considered a function of the location of individual retail locations." Analysis of Waco, Texas, data indicates "that location of competition and investment factors are extremely important considerations when attempting to explain differences in the number of consumers attracted to retail firms."

393. Horton, Frank E. and Robert I. Wittick. "A Spatial Model for Examining the Journey-to-Work in a Planning Context," PG, Vol. 21, July 1969, pp. 223-226. (2a,4,6c).

The dual of the transportation problem is analyzed. It is suggested that the dual is of interest to planners as an indicator of optimal locations for residential and employment growth.

394. Horton, Frank E. and David R. Reynolds. "Effects of Urban Spatial Structure on Individual Behavior," EG, Vol. 47, January 1971, pp. 36-48. (2a,4).

Based on Cedar Rapids, Iowa, data, the authors examine changes in spatial behavior as adjustments to changes in urban spatial structure, rather than as active agents of structural change, and focus on the concepts of objective spatial structure and action and activity space.

395. Horwood, Edgar M. "Freeway Impact on Municipal Land Planning Effort," HRBB 268, 1960, pp. 1-12. (4,7a).

A reexamination of some of the factors which impose serious limitations upon the integration of city planning and highway development processes. Survey indicates no uniform conceptualization of problems within and among agencies dealing with integrated planning.

396. Horwood, Edgar M. and Clark D. Rogers. "Electronic Mapping Research and Development," HRBB 347, 1962, pp. 147-155. (1,9).

A discussion of computer graphics and their applicability to transportation studies.

397. Horwood, Edward M. "Community Consequences of Highway Improvement," HRR, No. 96, 1965, pp. 1-7. (7a).

A correlation and evaluation of the economic and community impact of highway bypasses and circumferential freeways indicate small towns may suffer from bypasses, while a larger center may benefit. Circumferential freeway studies indicate the tendency of industrial and commercial activity to locate along these routes.

398. Houston, Cecil. "Market Potential and Potential Transportation Costs: An Evaluation of the Concepts and Their Surface Patterns in the U.S.S.R.," CG, Vol. 13, Autumn 1969, pp. 210-236. (2a,6b).

Various measures of mass and distance are used to examine their role in the macro geographic pattern of market potential and potential transportation costs.

399. Howe, Robert T. "Can the Urban Transportation Problem be Solved?" TQ, Vol. 14, January 1960, pp. 85-94. (4).

Treatment of behavior of gas and human movement, entropy and urban transportation, city planning and electrostatics. Conclusion: "Fundamentally, the urban transportation problem cannot really be solved."

400. Howe, Robert T. "A Theoretical Prediction of Work-Trip Patterns," HRBB 253, 1960, pp. 155-165. (2b,4,6c).

A model based on principals of electrostatics is used for the prediction of work-trip patterns in metropolitan areas.

401. Howe, Robert T. "A Theoretical Prediction of Work-Trips in the Minneapolis-St. Paul Area," HRBB 347, 1962, pp. 156-181. (2b,4,6c).

Predictions based on principals of electrostatics indicate potential use for predicting future distribution of work places and residences.

402. Howe, Robert T. "A Critical Analysis of an Origin-Destination Survey," HRR, No. 41, 1963, pp. 79-98. (2b,4,6c).

A 1957 O-D survey is evaluated using the author's field theory of movement model and the gravity model. The predicted patterns of movement and the pattern indicated by the survey are significantly different.

403. Hoyle, B. S. "Recent Changes in the Pattern of East African Railways," TEGS, Vol. 54, November 1963, pp. 237-242. (8a).

404. Hoyle, B. S. "Early Port Development in East Africa: An Illustration of the Concept of Changing Port Hierarchies," TEGS, Vol. 58, March-April 1967, pp. 94-102. (7c).

405. Hoyle, B. S. "East African Seaports: An Application of the Concept of 'Anyport'," TRANSACTIONS: INSTITUTE OF BRITISH GEOGRAPHERS, No. 44, 1968, pp. 163-183. (2a,7c).

East African ports are compared to a hypothetical pattern of port development. Changing patterns of port facilities are used to indicate stages of port evolution.

406. Hoyt, Homer. "The Effect of the Automobile on Patterns of Urban Growth," TQ, Vol. 17, April 1963, pp. 293-301. (4).

407. Huff, David L. "A Topographical Model of Consumer Space Preferences," PRSA, Vol. 6, 1960, pp. 159-173. (2b,6c).

The paper points out a number of factors which are felt to be important in conditioning consumer space preferences. The use of graph theory and matrix algebra make it possible to determine how each of these factors affect one another as well as the relative degree of interdependence of each element. The model presented permits the formulation and testing of hypotheses which specify distinctive features of these variables with respect to individual consumers of various types. The primary feature of this model is that it provides a scheme for explaining already observed behavior and is not intended to be a predictive tool.

408. Huff, David L. "A Note on the Limitations of Intraurban Gravity Models," LE, Vol. 38, February 1962, pp. 64-66. (2b).
409. Huff, David L. "A Probabilistic Analysis of Shopping Center Trade Areas," LE, Vol. 39, February 1963, pp. 81-90. (2,6).

Presentation of a model to determine retail trade of a shopping center.

410. Huff, David L. and George F. Jenks. "A Graphic Interpretation of the Friction of Distance in Gravity Models," AAAG, Vol. 58, December 1968, pp. 814-824. (2b).

Portrays complex three-dimensional surfaces stemming from gravity model to facilitate understanding of spatial behavior.

411. Humphrys, G. "The Journey to Work in Industrial South Wales," TRANSACTIONS: INSTITUTE OF BRITISH GEOGRAPHERS, No. 36, 1965, pp. 85-96. (6).

Workers tend to travel well beyond their local area to work, allowing for greater freedom of choice in industrial location.

412. Hunter, Holland. "The Passenger Car in the U.S.S.R." HRR, No. 115, 1966, pp. 64-70. (1,8b).

A general discussion of Russian attempts to avoid auto-oriented transportation problems, as evidenced in the West, by restricting private ownership of vehicles.

413. Hunter, Holland. SOVIET TRANSPORT EXPERIENCE: ITS LESSONS FOR OTHER COUNTRIES. Washington, D.C.: Brookings Institution, 1968. (1,8).

This book focuses on two aspects of Soviet transport policy: the effort to hold down transport investment to make existing investment serve more productively and the conscious decision to minimize road investment relative to investment in rail and water transport.

414. Hurst, Michael E. Eliot. "Land Use and Traffic Generation in Urban Areas, with Particular Reference to Perth," SCOTTISH GEOGRAPHICAL MAGAZINE, Vol. 80, 1964, p. 53. (2b,4,6c).

Investigates "traffic as a function of land use" in an Australian setting.

415. Hurst, Michael E. Eliot. "The Structure of Movement and Household Travel Behavior," US, Vol. 6, February 1969, pp. 70-82. (2b,4,6c).

Travel motivation is broken down into goals and occurrences. Life style and positional utility are described.

416. Hurst, Michael E. Eliot. "Land Use/Travel Movement Relationships," TQ, Vol. 23, April 1969, pp. 263-274. (2b,4,6c).

Multiple regression techniques are used to develop a descriptive model of traffic movement.

417. Hurst, Michael E. Eliot. "Confluence at the Work Site: Some Applications of Urban Work Journey Applications of Urban Work Journey Analyses," TRANSPORTATION RESEARCH, Vol. 4, 1970, pp. 163-184. (2b,4,6c).

"The purpose of this paper is to compare some alternative methods of analyzing work trip data, as applied to data collected in a recent survey in Perth, Scotland."

418. Hurst, Michael E. Eliot. "An approach to the Study of Non-residential Land Use Traffic Generation," AAAG, Vol. 60, March 1970, pp. 153-173. (2a,4,6c).

Results of analysis of Perth, Scotland, "indicate that there is a functional relationship between land use and the volume of urban travel, and that it appears that location and the intensity of use of the land are also important variables in such a relationship."

419. Hurter, Arthur P. and Leon N. Moses. "Transportation Investment and Regional Development," JOURNAL OF AMERICAN INSTITUTE OF PLANNERS, Vol. 30, May 1964, pp. 132-139. (2a,7).

This article discusses inter-regional linear programming models. The assumptions and data requirements of the efficiency and transportation models are examined and extensions and modifications of inter-regional linear programming are proposed.

420. Hutchinson, B. G. "A Planning Morphology for Transportation Systems," TQ, Vol. 20, July 1966, pp. 347-360. (1).

Review of planning concepts and the system concept.

421. Hyman, G. M. "The Calibration of Trip Distribution Models," ENVIRONMENT AND PLANNING, Vol. 1, 1969, pp. 105-112. (2b,4,6c).

A mathematical discussion of various distribution models.

422. Hymans, Edgar M. "Mass Transportation in Cincinnati: Past, Present, and Future," TE, Vol. 37, October 1966, pp. 49-53. (3,4,8f).
423. Hynes, Cecil V. "An Origin-Destination Study of Truck Traffic in Michigan," TQ, Vol. 21, April 1967, pp. 269-280. (6b,8b).

A study of truck movement by carrier type and state of origin and destination.

424. Irwin, N. A., Norman Dodd, and H. G. von Cube. "Capacity Restraint in Assignment Programs," HRBB 297, 1961, pp. 109-127. (2b,5,6).

A traffic simulation model incorporating a feedback mechanism by which capacity restraint and vehicle congestion are allowed to affect route generation, trip distribution, and vehicle assignment in successive program blocks.

425. Irwin, N. A. and H. G. von Cube. "Capacity Restraint in Multi-Travel Mode Assignment Programs," HRBB 347, 1962, pp. 258-289. (2b,4,5,6).

An intensive discussion of a model used for estimating vehicular and transit flow in Toronto, Canada. Capacity restraints and the resultant congestion in roads and parking lots are allowed to affect the choice of traffic mode, route selection, and trip volume distribution in successive program blocks.

426. Isard, Walter. LOCATION AND SPACE-ECONOMY. New York, New York: John Wiley, 1956. (2).
427. Isard, Walter, et al. "Interregional Flow Analysis and Balance of Payments Statements," METHODS OF REGIONAL ANALYSIS: AN INTRODUCTION TO REGIONAL SCIENCE. Cambridge, Massachusetts: M.I.T. Press, 1960, pp. 122-181. (2,6).

This chapter examines the location quotient, commodity flow investigations, regional and interregional money flow studies, and balance of payment statements. Several empirical applications of the techniques are given.

428. Isard, Walter. "Interregional Linear Programming," METHODS OF REGIONAL ANALYSIS: AN INTRODUCTION TO REGIONAL SCIENCE. Cambridge, Massachusetts: M.I.T. Press, 1960, pp. 413-492. (2,6).

The general interregional model presented in this chapter has been developed in its purely formal aspects, primarily to serve as background against which specific, useful models might be developed. Aside from the formal presentation of the model, applications to the dairy and coal industries are made.

429. Izyumskiy, O. A. "Transport Development of the Middle Ob Oil District," SGRT, Vol. 11, October 1970, pp. 89-94. (7b,8a,8c).

"Two basic alternative transport systems are analyzed for the new oil-producing districts along the Middle Ob valley in West Siberia. One is the construction of a railroad parallel to the Ob River; the other is in the use of the waterway itself."

430. Jamieson, G. B., W. K. Mackay, and J. C. R. Latchford. "Transportation and Land Use Structures," US, Vol. 4, November 1967, pp. 201-217. (2a,4,6c).

Comparisons of different urban land use distributions and their effect on travel.

431. Janelle, Donald G. "Spatial Reorganization: A Model and Concept," AAAG, Vol. 59, June 1969, pp. 348-364. (2a,7).

"Travel-time connectivity is a key factor in defining a process of the spatial reorganization of man's functional establishments. A case study relating highway development with the growth in wholesale activity for selected cities in the upper midwest of the United States indicates that, aside from being a good surrogate of transport efficiency, travel-time connectivity is also a good measure of the relative advantage of a given place in attracting to itself the centralization and specialization of human activity."

432. Jefferies, Wilbur R. and Everett C. Carter. "Simplified Techniques for Developing Transportation Plans--Trip Generation in Small Urban Areas," HRR, No. 240, 1968, pp. 66-87. (2b,4,9).

Socioeconomic and land use characteristics of small urban areas are analyzed to establish a simplified method of conducting transportation surveys. Vehicle ownership is considered a major indicator of trip generation.

433. Johnson, J. A., G. Potvin, and N. E. Wilson. "The Planning and Economics of High Speed Transportation for a Region under Rapid Urbanization," HSGTJ, Vol. 1, January 1967, pp. 32-46. (2a),

Decision rules for policy makers are developed using theoretical cost and value concepts.

434. Johnson, James F. "The Influence of Cost Distance Factors on the Overseas Export of Corn from the United States Midwest," EG, Vol. 45, April 1969, pp. 170-179. (6a).

Examines factors affecting the transportation of corn exports, finding a great disparity between linear and cost distances from locations to regional ports.

435. Johnson, R. J. "An Index of Accessibility and Its Use in the Study of Bus Service and Settlement Patterns," TESC, Vol. 57, January-February 1966, pp. 33-38. (2a).

436. Johnson, R. J. "The Distribution of an Intra-metropolitan Central Place Hierarchy," AUSTRALIAN GEOGRAPHICAL STUDIES, Vol. 4, April 1966, pp. 19-34. (2a,4).

437. Johnson, R. J. and Peter J. Rimmer. "A Note on Consumer Behavior in an Urban Hierarchy," JRS, Vol. 7, Winter 1967, pp. 161-166. (2a,4).

Postulated relationships between the central place hierarchy and consumer behavior are not substantiated.

438. Johnson, R. J. "Railways, Urban Growth and Central Place Patterns: An Example from South-east Melbourne," TESC, Vol. 59, January-February 1968, pp. 33-41. (4,7,8a).

439. Johnson, R. J. "An Outline of the Development of Melbourne's Street Pattern," AUSTRALIAN GEOGRAPHER, Vol. 10, September 1968, pp. 453-465. (3,5,7).

After outlining the historical development of the city and its street pattern, chi-square is used to test for differences in the basic grid pattern. The results are used as an indicator of high, intermediate, or low status housing.

440. Johnson, W. B., editor. TRAFFIC IN A NEW ZEALAND CITY. Christchurch, New Zealand: Regional Planning Authority, 1965. (4).

441. Jones, Richard M. "Local Labour Markets, the Journey to Work, and Government Location Policy," TPR, Vol. 41, April 1970, pp. 168-178. (1).

Identifies three distinct labor markets in industrial South Wales.

442. Jones, Robert W. "Method for Estimating Potential Increases in Traffic Volumes Based on O-D Survey Data from A Mid-Western City," HRR, No. 88, 1965, pp. 171-181. (2a,4,6c).

Factor analysis indicates socioeconomic level and proportion of land-use devoted to single family residences are the principal criteria associated with trip generating potential of O-D zones.

443. Jordan, Thomas D. "Development of the Sky Count Technique for Highway Traffic Analysis," HRR, No. 19, 1963, pp. 35-46. (9).

The wide and rapid coverage of areas is a major advantage of airphoto techniques.

444. Kagayama, Tomoo. "Commuter Traffic in Tokyo and Osaka," TQ, Vol. 19, November 1965, pp. 609-622. (4,5c,6c).

Treatment of rapid transit network, traffic volume and capacity, and new projects to alleviate congestion.

445. Kain, John F. "The Journey to Work as a Determinant of Residential Location," PRSA, Vol. 9, 1962, pp. 137-160. (2,4,7).

The paper presents empirical evidence on the manner in which transportation costs influence the household's choice of a residential location and describes a residential location model. The hypothesis central to research is that households substitute journey-to-work expenditures for site expenditures. This substitution depends primarily on household preferences for low density residential services.

446. Kain, John F. "The Development of Urban Transportation Models," PRSA, Vol. 14, 1965, pp. 147-173. (4).

This paper discusses the objectives and summarizes some of the principal findings of a large-scale model building activity--the RAND Corporation study of urban transportation. The importance of this project lies in treating large-scale research problems instead of being tied to solving the urban transportation problems of any specific municipality or urban area.

447. Kain, John F. "Postwar Metropolitan Development: Housing Preferences and Auto Ownership," AER, Vol. 57, May 1967, pp. 223-234. (2a,4).

Correlation techniques indicate income is a greater determinant of auto-ownership than family size and residential density. The hypothesis that automobile ownership and residential density are jointly and simultaneously determined was not affirmed conclusively.

448. Kanaan, Nuha J. "Structure and Requirements of the Transport Network of Syria," HRR, No. 115, 1966, pp. 19-28. (2a,5a).

Graph theoretic measures and multiple regression are used to analyze network structure and spatial variation in the distributions of population and economic activity. Iterative analysis for distinct time periods demonstrates increases or decreases in the accessibility of urban places to the network.

449. Kansky, Karl J. STRUCTURE OF TRANSPORTATION NETWORKS. Department of Geography Research Paper No. 84, Chicago, Illinois: University of Chicago Press, 1963. (2,5a,5b,5c).

This study explores the utility of certain graph theoretic indices in the study of regional transportation systems.

450. Kansky, Karl J. "Travel Patterns of Urban Residents," TS, Vol. 1, November 1967, pp. 261-285. (2a,4).

"This paper proposes a method of describing and classifying traffic patterns of urban residents," using factor analysis on Chicago data.

451. Kaplan, Norman N. "The Growth and Output and Inputs in Soviet Transport and Communications," AER, Vol. 57, December 1967, pp. 1154-1167. (8).

Output indexes for communications and transportation systems are constructed and compared with United States data. A retardation in output growth within the post-war era is noted.

452. Kaufmann, John H. "Planning for Transport Investment in the Development of Iran," AER, Vol. 52, May 1962, pp. 396-404. (7).

Integrated transport and communications development should be designed in terms of land, population, and natural resources, as they relate to the perspective values of the country's inputs and technological and engineering constraints.

453. Kezanskiy, N. N. and Yu. V. Lasis. "Methods of Forecasting Freight Flows in Planning a Transport Net," SGRT, Vol. 4, September 1963, pp. 3-18. (2a,6b,8a).

Discussion of the distribution of freight flows among existing and planned networks, based on traffic expected from planned regional production.

454. Keefer, Louis E. "Estimating the Daily Vehicle Miles of Travel in the Chicago and Pittsburgh Metropolitan Areas," HRBB 281, 1961, pp. 1-15. (4,6c).

455. Keefer, Louis E. "Characteristics of Captive and Choice Transit Trips in the Pittsburgh Metropolitan Area," HRBB 347, 1962, pp. 24-33. (4,6c).

Finds significantly different trip characteristics for those who choose to use mass transit and those who have no alternative to transit usage.

456. Keefer, Louis E. "A New Transportation Plan for Pittsburgh," TQ, Vol. 17, November 1963, pp. 544-556. (4).

Describes the plan and the prospects of its implementation, including some of the unusual problems.

457. Keefer, Louis E. "Shaping the Demand for Mass Transportation," TQ, Vol. 18, October 1964, pp. 589-596. (4,8f).

The difficult problems involved in shaping mass transit demand are outlined.

458. Kellett, John R. "Urban and Transport History from Legal Records: An Example from Glasgow Solicitors' Papers," JTH, Vol. 6, November 1964, pp. 222-240. (3,4,8a,9).

Using solicitors' records, this case study indicates the broad range of available information concerning attitudes and actions of landholders, types of agriculture practiced, mineral deposits, existing road facilities, and market outlets, which is complementary to a study of railroad development.

459. Kemp, Barbara. "Social Impact of a Highway on an Urban Community," HRR, No. 75, 1964, pp. 92-102. (4,7a).

To reduce possible harmful social effects of freeway location, families were interviewed; most did not want to leave the area, felt they could not influence the location decision, and felt that displacement should not occur until sufficient housing was available for the displaced.

460. Kennedy, Charles J. "Commuter Services in the Boston Area, 1835-1860," BUSINESS HISTORY REVIEW, Summer 1962, Vol. 36, pp. 153-170. (3,7).

An analysis of the importance of fare structures and services on suburban growth.

461. Kent, Malcolm F. "Intercity Freight Haulage, By Commodity, Shipping Density and Type of Transport, 1960," HRR, No. 82, 1965, pp. 1-31. (6b,8).

Freight haulage is described using data gathered by the Bureau of the Budget and the Interstate Commerce Commission.

462. Kenyon, James B. "Elements in Inter-Port Competition in the United States," EG, Vol. 46, January 1970, pp. 1-24. (7c).

"The object of this paper is to analyze the shifting magnitudes and composition of general cargo freight among selected United States ports in terms of the extent and makeup of their domestic hinterlands, their overseas trade orientation, and the economic character of the port metropolis itself, and to review some of the changing conditions and practices that seem to hold special significance to the competitive struggle among American ports."

463. Kerr, Donald. "The St. Lawrence Seaway and Trade on the Great Lakes, 1958-63," CG, Vol. 8, 1964, pp. 188-196. (8c).

464. Kerr, L. W. "Determination of O-D Zones by Means of Land-Use Data," HRBB 347, 1962, pp. 182-185. (4,9).

A review of factors to consider in establishing O-D zones.

465. Keyes, Lucile Sheppard. "The Transpacific Route Investigation: Historical Background and Some Major Issues," JOURNAL OF AIR LAW AND COMMERCE, Vol. 34, Winter 1968, pp. 1-26. (5,8d).

This investigation considers the problem of regulating freight rates and passenger fares for international air carriers. The characteristics of the administrative processes which lead to the awarding of major international air routes are discussed.

466. Kibal 'chich O. A. "The Distribution of Population and Related Indicators in Long-Term Planning of Passenger Traffic," SGRT, Vol. 4, September 1963, pp. 26-35. (6b).

Presentation of a methodology to forecast "passenger intensity" of population centers and economic regions.

467. Kiley, Edward V. "Highways as a Factor in Industrial Location," HRR, No. 75, 1964, pp. 48-52. (7a).

A survey of businesses to examine the influence of highways on locational decisions. Location factors mentioned most frequently, in order, are: proximity to good highways, abundant labor supply, availability of suitable land, and proximity to markets.

468. King, H.W.H. and E. R. Woolmington. "The Role of the River in the Development of Settlement in the Lower Hunter Valley," AUSTRALIAN GEOGRAPHER, Vol. 8, September 1960, pp. 3-16. (7,8c).

469. Kirby, Arthur. "The Effect of Port Re-organization in Great Britain," ITJ, Vol. 31, May 1965, pp. 133-139 and 148. (7c).

More comprehensive powers for port authorities and more emphasis on containerization and unitization would speed the movement of cargo through ports, helping to solve the fundamental problems of overloading and congestion.

470. Kish, George. "Soviet Air Transport," GR, Vol. 48, July 1958, pp. 309-320. (8d).

Air traffic in the U.S.S.R. and major air traffic centers.

471. Kish, George. "Railroad Passenger Transport in the Soviet Union," GR, Vol. 53, July 1963, pp. 363-376. (6b,7a).

472. Kish, George. "Transportation within the European Economic Community: Problems and Policies," EAST LAKES GEOGRAPHER, Vol. 1, 1964, pp. 13-20. (3,7,8).

473. Kissling, C. C. "Linkage Importance in a Regional Highway Network," CG, Vol. 13, Summer 1969, pp. 113-127. (2a,5a).

The graph theoretic measure of accessibility developed by Shimbel is used to analyze the regional highway network of Nova Scotia. Highly accessible nodes indicate areas of high economic activity.

474. Klar, James S. and Israel Resnifoff. "Land Use and Transportation Planning," TQ, Vol. 19, April 1965, pp. 169-187. (1).

A report on transport planning in Connecticut.

475. Klein, Maury and Kozo Yamamura. "The Growth Strategies of Southern Railroads, 1865-1893," BUSINESS HISTORY REVIEW, Vol. 41, Winter 1967, pp. 358-377. (3,8a).

The growth strategies of Southern railroads appear to be dependent upon individual situations, producing a spectrum of strategies.

476. Knox, Naphtali K. "A Simplified Traffic Model for Small Cities," TQ, Vol. 16, July 1962, pp. 336-350. (2b,4,6c).

The paper shows how established gravity model techniques can be applied in analyzing proposed traffic systems based on general land use plans for a small city.

477. Kock, A. Robert and M. Snodgrass. "Linear Programming Applied to Location and Product Flow Determination in the Tomato Processing Industry," PRSA, Vol. 5, 1959, pp. 151-162. (2,6b).

This paper uses the transportation model of linear programming to investigate a few specific inter-regional problems relating to the tomato processing industry in the U.S.

478. Kolars, John and Henry J. Malin. "Population and Accessibility: An Analysis of Turkish Railroads," GR, Vol. 60, April 1970, pp. 229-246. (2a,5c,8a).

Describes a method for simulating the growth of a railroad network, the results of which are compared with detailed historical summary of railroads in Turkey.

479. Kole, Charles P. "Variation of Work-Home Trip as Function of Travel Time," TE, Vol. 35, December 1964, pp. 23-27 and 47. (2b,4,6c).

Regression analysis of work-trips shows strong relationship to travel time in Phoenix.

480. Kolifrath, Michael and Paul W. Shuldiner. "Covariance Analysis of Manufacturing Trip Generation," HRR, No. 165, 1967, pp. 117-128. (2b,4,6c).

Covariance analysis is used to test the utility of subdividing manufacturing land into subclasses for estimating trip attractions.

481. Kresge, David T. and Paul O. Roberts. "Simulation of Policy Alternatives for Columbia," AER, Vol. 58, May 1968, pp. 341-359. (2a,5c).

Combines macro-economic modeling with detail simulation of transport network development in multiple time periods, allowing comparison and evaluation of alternate development strategies, policies, and investment plans.

482. Krusling, James R. "Cincinnati's Highway System," TE, Vol. 37, October 1966, pp. 31-34. (3,4,8b).

Historical survey.

483. Kuei-Sheng Chang. "The Changing Railroad Pattern in Mainland China," GR, Vol. 51, October 1961, pp. 534-548. (8a).

484. Kuhn, Herman A.J. "Factors Influencing Traffic Generation at Rural Highway Service Areas," HRR, No. 240, 1968, pp. 1-10. (6).

The factors of visibility, accessibility, facility type, location with reference to other facilities, and interchange class strongly influence the volume of traffic at rural service areas.

485. Kurylo, Walter. "A Look at the Pan American Highway System," TQ, Vol. 18, April 1964, pp. 143-155. (8b).

Travel conditions on the Inter-American Highway.

486. Lachene, Rene. "Networks and the Location of Economic Activities," PRSA, Vol. 14, 1965, pp. 183-196. (5,7).

The paper focuses upon the problem of intense concentration of activity at one point of a national territory. An observation of an actual situation (Paris) led the author to ask what part transportation plays in affecting the geographical distribution of activities and to build representative models of the simplest kinds of relationships.

487. Lancaster, Jane. "A Railroad to Great Slave Lake," PG, Vol. 13, September 1961, pp. 31-35. (8a).

The paper is a policy statement of the needs for a railway system servicing the mineral-rich areas surrounding Great Slave Lake.

488. Landon, Charles E. "The Recent Development of Freight Traffic on the Mississippi River," JTH, Vol. 5, May 1961, pp. 33-53. (8c).
489. Lang, A. S. and Martin Wohl. "Evaluation of Highway Impact," HRBB 268, pp. 105-119. (7a).

The term "impact" is analyzed and the evaluation of user and non-user benefits are discussed. Traffic engineers and social scientists must work in conjunction to formulate basic concepts of highway impact.

490. Lansing, John B. and Eva Mueller. "Residential Location and Urban Mobility," HRR, No. 106, 1966, pp. 77-96. (2,4,6c).

Residential patterns are defined by density and distance in miles from the center of the city. Locational preferences are examined, and journey-to-work trips are described by mode and distance of travel. The existing pattern of location is influenced by family income and by stage in the family life style.

491. Lansing, John B. and Gary Hendricks. "How People Perceive the Cost of the Journey to Work," HRR, No. 197, 1967, pp. 44-55. (2a,4,6c).

Most people do not estimate the costs of journeying-to-work; however, when the cost is estimated, fuel cost estimating is too high. People are aware of parking fees at the workplace, but are unaware of trip costs for different modes of travel.

492. Lapin, Howard A. "Index Numbers for Urban Travel," JOURNAL OF AMERICAN INSTITUTE OF PLANNERS, Vol. 27, August 1961, pp. 215-217. (4,9).

The desirability of preparing and maintaining indices of vehicular passenger miles at local, regional, and national levels.

493. Larson, C. Theodore. "The Motor Road: Forerunner of the Universal City," TQ, Vol. 18, October 1964, pp. 459-490. (1,5a,8b).

A look at the major highway networks of the continents and at urban growth.

494. Lathrop, George T., John R. Hamburg, and Frederick Young. "Opportunity-Accessibility Model for Allocating Regional Growth," HRR, No. 102, 1965, pp. 54-66. (2a,7).

A description of an allocation model based largely on access to a regional center or set of sub-centers.

495. Lawton, R. "The Journey to Work in England and Wales: Forty Years of Change," TESS, Vol. 54, March 1963, pp. 61-69. (3,4).
496. Leathers, Nancy J. "Residential Location and Mode of Transportation to Work: A Model of Choice," TRANSPORTATION RESEARCH, August 1967, pp. 129-155. (4,8).
497. Lee, G.H.C. "The New Mass Market in Air Travel," ITJ, Vol. 31, March 1965, pp. 101-103. (8d).
- A brief discussion of the reasons for an increase in air passenger service and the problems created.
498. Lees, Audrey. "Car Parking in Cities," TPR, Vol. 34, April 1963-64, pp. 39-49. (4).
- A look at the problem in Coventry, England.
499. Lenly, James H. "Mississippi River: St. Louis' Friend or Foe?" BUSINESS HISTORY REVIEW, Vol. 39, Spring 1965, pp. 7-15. (8a,8c).
- Conflict between Chicago and St. Louis over the use of rails or the river.
500. Letendre, Gene and George V. Wickstrom. "The Dataplotter-- A Tool for Transportation Planning," HRBB 347, 1962, pp. 203-210. (9).
- Evaluation of computerized mapping techniques.
501. Levin, David R. "The Highway Interchange Land-Use Problem," HRBB 288, 1961, pp. 1-24. (7a).
- Methods of controlling land usage at expressway interchanges are analyzed and evaluated in terms of their potential effectiveness, cost, and administration.
502. Levin, David R. "Informal Notes on Sociological Effects of Highways," HRR, No. 75, 1964, pp. 82-83. (7a).
503. Levin, Melvin R. and David A. Grossman. "The Expressway Impact on a Secondary Central Business District," TQ, Vol. 15, April 1961, pp. 185-207. (7a).
- The economic impact of the freeway on Pawtucket, Rhode Island.

504. Levinson, Herbert S. and F. Houston Wynn. "Some Aspects of Future Transportation in Urban Areas," HRBB 326, 1962, pp. 1-31. (4).

Fundamental inter-relationships between land use, socio-economic status, and transportation mode.

505. Levinson, Herbert S. and F. Houston Wynn. "Effects of Density on Urban Transportation Requirements," HRR, No. 2, 1963, pp. 38-64. (2a,4,6c).

Intra- and inter-city transportation requirements are related to parameters of population density. Regional and historical effects of population density and their relationship to travel behavior are extensively analyzed.

506. Levinson, Herbert S. and Kenneth R. Roberts. "System Configurations in Urban Transportation Planning," HRR, No. 64, 1964, pp. 71-83. (4,5).

Analysis indicates urban freeway systems should avoid convergence in central areas; a grid system would achieve more equitable freeway loadings than a radial circumferential system.

507. Lewis, E. V. "Transportation Modal Interfaces," HSGTJ, Vol. 2, May 1968, pp. 339-352. (8).

Evaluates the concept of containerization and discusses its impact on trade and transport facilities.

508. Lewis, G. J. "Commuting and the Village in Mid-Wales," G, Vol. 52, July 1967, pp. 294-304. (4,7a).

A case study of an area suffering from depopulation and an assessment of the impact of commuting on the socio-economic structure of the village. The influence of commuting in planning future settlements.

509. Lewis, James E. "Changes in Highway Mobility in the United States South: 1940 to 1960," FG, Vol. 20, November 1968, pp. 382-387. (7,8b).

The use of a simple technique for measuring and mapping highway mobility as a means of identifying relative levels of economic development is demonstrated in this paper. Illustration of the technique is made by examining changes in the level of highway mobility in the Southern states during the 1940-1960 period.

510. Leyland, George P. "Implication of the New Haven Census Use Test for Transportation and Land-Use Planning," HRR, No. 229, 1968, pp. 77-98. (2a,4,9).

A special census which incorporates data to be gathered by the 1970 national census is used to generate base file. The file is a valuable tool for planners in formulating an efficient and inexpensive planning information system.

511. Lichfield, Nathaniel and Honor Chapman. "Cost Benefit Analysis and Road Proposals for a Shopping Centre. A Case Study: Edgware," JTEP, Vol. 2, September 1968, pp. 280-320. (4,5b).

512. Lieper, Joseph McC. "The Role of the Automobile in Mid-town Manhattan," TQ, Vol. 16, April 1962, pp. 212-228. (4).

The core activities, the priority of space needs, and their linkage are evaluated to develop the basis for future policies on transportation access and circulation; concludes that the only alternative is improved mass transportation systems.

513. Lieper, Joseph McC. "Transportation Planning in a Mature Metropolis," URBAN AFFAIRS QUARTERLY, Vol. 1, December 1965, pp. 22-38. (1,4).

Survey of problems in transport planning in New York City.

514. Lindsay, Jean. "The Aberdeenshire Canal, 1805-54," JTH, Vol. 6, May 1964, pp. 150-165. (3,8c).

Historical survey.

515. Lissitzyn, Oliver J. "The Participation of the United States in World Air Transport: Statistics and the National Interest," JOURNAL OF AIR LAW AND COMMERCE, Vol. 28, Winter 1961-62, pp. 1-17. (8d,9).

Discussion of the reliability of statistics dealing with U. S. air transport.

516. Lloyd, Trevor and David C. Nutt. "Transportation of Ungava Iron Ore," CG, Vol. 4, 1960, pp. 26-38. (6a).

A general discussion of the project, including aspects of transporting the concentrated ore and a discussion concerning selection of an ice-free port site in Greenland.

517. Loewenstein, Louis K. "Commuting and the Cost of Housing in Philadelphia," TQ, Vol. 17, April 1963, pp. 302-319. (2,4).

The article shows that, to a certain extent, higher housing costs and the larger and more costly journey-to-work are both a function of distance from the downtown area.

518. Logan, M. I. "Work-Residence Locations in the City," AUSTRALIAN GEOGRAPHICAL STUDIES, Vol. 6, October 1968, pp. 151-166. (4,6c).

Concepts of urban form and function are reviewed with specific reference to the labor-shed in Sydney, Australia. The study indicates a major trend away from the mononuclear concept of an urban region.

519. Long, A. "Internal Transport Developments in East Africa," G, Vol. 50, January 1965, pp. 78-81. (8).

Reviews recent activities expanding railways, lake services, and ports.

520. Long, Peter and Lewis Hayashi. "Traffic and Travel in Thailand," TE, Vol. 37, July 1967, pp. 72-75. (1).

521. Long, Wesley H. "City Characteristics and the Demand for Interurban Air Travel," LE, Vol. 44, May 1968, pp. 197-204. (4,8d).

An assessment of the effects of demographic and geographic characteristics of large cities on air travel.

522. Longley, James W. and Beatrice T. Goley. "A Statistical Evaluation of the Influence of Highways on Rural Land Values in the United States," HRBB 327, 1962, pp. 21-55. (7a).

Rural land sales are examined to determine the relation between type of road and price per acre and price per farm and distance to nearest trading center. Higher prices per acre are associated with hard surfaced roads and proximity to trading centers. Regional variations in the pattern are examined for selected areas in the United States.

523. Lonsdale, Richard E. "Two North Carolina Commuting Patterns," EG, Vol. 42, April 1966, pp. 114-138. (2b,6b).

Analysis of commuting characteristics, labor market areas, personal factors affecting commuting, with an example of probability models to simulate traffic, based on two factories employing workers of different economic levels.

524. Loubal, Peter S. "A Network Evaluation Procedure," HRR, No. 205, 1967, pp. 96-109. (2a,5c,6).

A procedure for considering the effects of new and improved network links on travel time and volume of traffic flow is described. It is a variation of minimum path tree-building and traffic loading procedures.

525. Lovejoy, Warren B. "New York Port Authority's 1958 O-D Survey Using Continuous Sampling," HRBB 253, 1960, pp. 152-154. (4,9).

The rationale and technique of continuous sampling are described. Continuous sampling avoids the effects of short term variations in traffic patterns that might influence the reliability of data gathered in short, intensive traffic surveys.

526. Lowry, Ira S. "Location Parameters in the Pittsburgh Model," PRSA, Vol. 11, 1963, pp. 145-165. (2,4).

A model is constructed which assumes the distribution of basic activities and proceeds to distribute around each work-place a residential population which supplies the labor force and acts as a base for the location of population-serving activities. The market-potential of each location is evaluated and retail and service employment is spatially distributed according to these potentials.

527. Luster, George A. and Wade G. Fox. "Cartographic and Design Work for a Comprehensive Origin-Destination Survey," HRBB 297, 1961, pp. 52-73. (4,9).

The methods and procedures used for the analysis and representation of Pittsburgh Area Transportation Study data.

528. McConnell, James E. "A Note on the Geography of Commodity Trade," FG, Vol. 22, July 1970, pp. 181-184. (2,6a).

Points up areas of neglect and summarizes theoretical and empirical foundations for further research.

529. McCutcheon, W. A. "The Newry Navigation: The Earliest Inland Canal in the British Isles," G, Vol. 129, December 1963, pp. 466-480. (3,7.7c).

The growth and decline of the Newry Navigation and the impact of canal traffic on the port of Newry.

530. McElhiney, Paul T. "Evaluating Freeway Performance in Los Angeles," TQ, Vol. 14, July 1960, pp. 296-312. (4).
531. McElroy, J. P. "Pedestrian Conveyors," TPR, Vol. 32, July 1961, pp. 125-140. (3,4).

History of conveyors and their application to urban congestion.

532. McFarlane, Marion. "Developments in Southland, New Zealand: The Port of Bluff," G, Vol. 46, July 1961, pp. 250-252. (7c).

Report on port renewal.

533. McGrath, William R. "Transportation and Urban Development," TQ, Vol. 18, October 1964, pp. 491-501. (4).

A statement of the importance of coordinated transport planning for urban development.

534. McIlwraith, Thomas F. "The Adequacy of Rural Roads in the Era before Railways: An Illustration from Upper Canada," CG, Vol. 14, 1970, pp. 344-360. (8b).

A challenge to the traditional belief that early Ontario roads were intolerable. Roads were found to be of limited importance in land choice by early settlers.

535. McKain, Walter C. "Community Response to Highway Improvement," HRR, No. 96, 1965, pp. 19-23. (4,7a).

The influence of human factors and social conditions.

536. McKenna, David. "Commuting in the 1970's," ITJ, Vol. 32, 1967, pp. 87-93. (4,6).

537. MacKinnon, Ross D. "Dynamic Programming and Geographical Systems," EG, Vol. 46, June 1970, pp. 350-366. (2a).

Dynamic programming is outlined, geographical applications are discussed (including applications to transportation systems), and advantages and limitations are considered.

538. MacNab, J. W. "The Air Freight Industry of New Zealand," NEW ZEALAND GEOGRAPHER, Vol. 16, 1960, pp. 190-203. (5a,6b,8a).

Brief survey of routes and freight traffic within New Zealand.
539. Mactier, Stewart. "Cargo Handling in the Deep-Sea Liner Trades," ITJ, Vol. 31, November 1964, pp. 13-19. (7c,8c).

"A review of the problem of cargo liner turn-round in port in relation to current and future trends."
540. Mahon, G. R. "Railways and Bogs in Ireland," JTH, Vol. 5, November 1961, pp. 116-126. (5a,8a).

Notes on building permanent and temporary railways over Irish bogs.
541. Malik, Rashid A. "Pakistan's Intra-Regional Pattern of Transportation," JG, Vol. 61, 1962, pp. 209-214. (8).

The characteristics of land and water transportation.
542. Malo, Alger F. "The Relation of Mass Transportation to Total Transportation in Detroit," TQ, Vol. 15, April 1961, pp. 226-247. (4,8).
543. Maloney, William L. "Shifts in Petroleum Transportation," HRR, No. 82, 1965, pp. 100-103. (8c).
544. Manheim, Marvin L. "Data Accuracy in Route Location," TQ, Vol. 15, January 1961, pp. 153-178. (5b).

An enumeration of steps and variables to consider in route location decisions.
545. Manheim, Marvin L. "Transportation, Problem-Solving and the Effective Use of Computers," HRR, No. 148, 1966, pp. 49-58. (1,2a).
546. Manheim, Marvin L. "Principles of Transport Systems Analysis," HRR, No. 180, 1967, pp. 11-20. (1,2a).
547. Manners, Gerald. "Public Transport Policy and the Railways of the U.S.A.," SCOTTISH GEOGRAPHICAL MAGAZINE, Vol. 76, 1960, pp. 172-176. (3,6b,8a).

Description of changes in competitive position of U.S. railway freight and passenger traffic.

548. Manners, Gerald. "Transport Costs, Freight Rates and the Changing Economic Geography of Iron Ore," G, Vol. 52, July 1967, pp. 260-279. (3,6b).

A comparison of world trade patterns in iron ore in 1950 with patterns in 1960.

549. Marble, Duane F. "Transport Inputs at Urban Residential Sites," PRSA, Vol. 5, 1959, pp. 253-266. (2,4,7).

This paper represents an attempt to raise the level of information regarding transport inputs to households through an empirical examination of the transport inputs to a number of households in a medium-sized American city. Two separate studies were undertaken using a linear regression model, one with trip frequency as the dependent variable, and the total distance traveled as the dependent variable in the second study. A decision model is then proposed wherein an individual must choose from among a set of trips whose relative desirability depends upon one's completeness of information.

550. Marble, Duane F. "User Services and the Demand for Land at Interchange Points," HRBB 288, 1961, pp. 25-31. (2a,7a).

Characteristics of the service industry and user reaction to the prohibition of commercial construction on rights-of-way of the interstate highway system; suggestions for further research on user services and demand for land at interchanges.

551. Marble, Duane F. "Some Cultural and Social Aspects of Transport Impact on Underdeveloped Areas," in F. Pitts, editor, URBAN SYSTEMS AND ECONOMIC DEVELOPMENT. Eugene, Oregon: University of Oregon, School of Business Administration, 1962, pp. 39-43. (7).

A short statement emphasizing the need for greater understanding of the cultural and social aspects of transport impact.

552. Marble, Duane F. "A Theoretical Exploration of Individual Travel Behavior," QUANTITATIVE GEOGRAPHY PART I: ECONOMIC AND CULTURAL TOPICS. W. L. Garrison and D. F. Marble. Evanston, Illinois: Northwestern University, Department of Geography, 1967, pp. 33-53. (2,4,6c).

The study offers a preliminary exploration of some theoretical aspects of day-to-day movement patterns exhibited by most individuals. Game-theoretic formulations are presented for the analysis of complex decision situations of individual travel behavior.

553. Marcellis, Jack C. "An Economic Evaluation of Traffic Movement at Various Speeds," HRR, No. 35, 1963, pp. 18-40. (2a).

Discussion of the cost of resources consumed by the transportation industry. Optimal traffic speeds, which minimize the cost of traffic movement in a variety of situations, are established for passenger and commercial vehicles.

554. Marcou, George T. "A Survey of the Literature on Inter-Community Traffic," HRBB 347, 1962, pp. 302-318. (4,9).

Includes an annotated bibliography.

555. Martin, Brian V. and Charles B. Warden. "Transportation and Planning in Developing Countries," TQ, Vol. 19, January 1965, pp. 59-75. (7b).

Indicates the need for comprehensive planning and presents a model to evaluate alternative plans "for particular combinations of economic and geographic conditions."

556. Martin, Brian V. and Marvin L. Manheim. "A Research Program for Comparison of Traffic Assignment Techniques," HRR, No. 88, 1965, pp. 69-84. (2b,4,6c).

A computer program which allows for incremental loading of the network and the use of a generation curve function to revise input interzonal transfers.

557. Marx, Daniel, Jr. "Regulation of International Liner Shipping and Freedom of the Seas," JOURNAL OF INDUSTRIAL ECONOMICS, Vol. 16, November 1967, pp. 46-62. (6a,8c).

An extensive discussion of alleged inequities in the rates charged by ocean liners to carry cargo.

558. Matsumoto, Hiroshi. "An Expressway for Tokyo," TQ, Vol. 16, November 1962, pp. 590-606. (4,8b).

Planning methods, financial organization, and economic consideration for the construction of the first expressway are reviewed in the context of Tokyo's needs and characteristics.

559. Maxwell, David. "The Regulation of Motor-Carrier Rates by the Interstate Commerce Commission," LE, Vol. 36, February 1969, pp. 79-91. (8b).

560. May, Adolf D. Jr., Patrick Athol, William Parker, and James B. Rudden. "Development and Evaluation of Congress Street Expressway Pilot Detection System," HRR, No. 21, 1963, pp. 48-68. (4,9).

Automatic traffic control measures used in a pilot project in the Chicago area are described. Speed, volume, and density data are automatically gathered, recorded, mapped, and analyzed. A comprehensive data library, suitable for macro- and microscopic analysis has been one result of the project.

561. Mayer, Albert J. and Robert B. Snock. "The Continuing Traffic Study: Methods of Keeping O-D Data Up-to-Date," HRBB 253, 1960, pp. 109-113. (4,9).

562. Mayer, Albert J. and Joanne L. Wallace. "A New Method of Obtaining Origin and Destination Data," HRBB 347, 1962, pp. 34-39. (9).

By interviewing people at the time they renewed their licenses at the local auto bureau, traffic survey costs were substantially reduced. The advantages and disadvantages of this technique are discussed.

563. Mayer, Albert J. and Sue M. Snock. "Public Response to Increased Bus Service," HRR, No. 2, 1963, pp. 79-93. (4).

Interviews indicated a public desire for more bus service; yet reluctance to use the facilities was observed.

564. Mayer, Harold M. "Prospects and Problems of the Port of Chicago," EG, Vol. 31, April 1955, pp. 95-125. (3,7c).

Describes the historical development of the port and its facilities. The most serious limitations to future potential traffic are the inadequacies of the channels in the Chicago area and the lack of a comprehensive regional port plan.

565. Mayer, Harold M. "Urban Geography and Urban Transportation Planning," TQ, Vol. 17, November 1963, pp. 610-631. (1,4).

An excellent introductory article on the basic concepts of urban geography.

566. Mayer, Harold M. "Some Observations of the Future of Cities and Urban Areas," TQ, Vol. 10, July 1964, pp. 371-382. (4).

Reviews the trend toward urbanization and the decline of mass transit and predicts increased concentration of population in large urban centers and of traffic in cities and on high-capacity routes.

567. Mayer, Harold M. "High-Speed Rail Passenger Transportation and Regional Development in the Midwest," TQ, Vol. 21, July 1967, pp. 395-405. (4,7,3a).

A consideration of a high-speed rail facility and its possible impact on the Chicago region of the U.S.

568. Mazanova, M. B. "The Role of Maritime Transportation in the Economic Ties between the Economic-Geographic Regions of the U.S.S.R.," SGRT, Vol. 1, April 1960, pp. 59-63. (6b,7,8c).

Brief treatment of the region-forming role of sea transportation.

569. Mazanova, M. B. "Marine Transport as a National Specialized Activity of a Major Economic Region," SGRT, Vol. 4, May 1963, pp. 3-9. (8c).

"The role of maritime transport, particularly overseas shipping, is discussed for several Soviet economic regions."

570. Mead, W. R. "Problems of a Divided Waterway," G, Vol. 47, January 1962, pp. 89-92. (3,8c).

Outlines history of Finland's Saimaa Canal and the political problems of rebuilding the canal as a joint Finnish-Russo project.

571. Meadows, R. "Traffic and Marketing Aspects of Service Station Locations and Development in Australia," TQ, Vol. 21, January 1967, pp. 67-82. (7a).

572. Medhurst, Franklin. "Traffic Induced by Central Area Functions," TPR, Vol. 34, April 1963-64, pp. 50-60. (4).

Describes a survey undertaken to determine the size and drawing power of the CBD in Manchester, England.

573. Medvedkov, Y. "Entropy: An Assessment of Potentialities in Geography," EG, Vol. 46, June 1970, pp. 306-316. (2,6).

Concludes that "the concept of entropy acts as a catalyst for better insight into complex relationships" and has application to flows data.

574. Meinig, D. W. "A Comparative Historical Geography of Two Railnets: Columbia Basin and Southern Australia," AAG, Vol. 52, December 1962, pp. 394-413. (3,5b,3a).

This extensive discussion of the two railnets emphasizes the importance of understanding the present railway pattern in terms of the process of its formation.

575. Melanid, Alexander. "Transportation in Eastern Arabia," GR, Vol. 52, January 1962, pp. 122-124. (1).
576. Mellor, R.E.H. "Through-Railway Links between U.S.S.R. and Its Neighbors," G, Vol. 49, November 1964, pp. 416-418. (8a).

Describes the use of rolling stock which may be used on different gauge railways merely by interchanging broad-gauge bogies with standard ones, or vice versa.

577. Memmott, Frederick W., Brian V. Martin, and Alexander J. Bone. "Predicting Future Demand for Urban Area Transportation," HRBB 326, 1962, pp. 69-97. (2a,4,6c).

The transportation planning process is described and divided into the principal phases of inventories, estimates of urban growth, and the determination of future travel demand. An annotated bibliography pertaining to the prediction of future demands for urban area transportation is included.

578. Meyer, John R., J. F. Kain, and M. Wohl. THE URBAN TRANSPORTATION PROBLEM. Cambridge, Massachusetts: Harvard University Press, 1965. (1,4,6,7,8).

A synthesis of the major empirical generalizations derived from a number of U. S. metropolitan transportation studies. Changes in location, trip travel patterns, line-haul systems and pricing procedures are discussed.

579. Meyer, John R. "Transport Technologies for Developing Countries," AER, Vol. 56, May 1966, pp. 83-90. (7b,8).

A review of several transport systems (rail, air, and truck) and their application to underdeveloped countries.

580. Meyer, John R. "Urban Transportation," in THE METROPOLITAN ENIGMA, James Q. Wilson, editor, Cambridge, Massachusetts: Harvard University Press, 1968, pp. 41-69. (1,4).

A valuable overview.

581. Mickle, D. Grant. "The Role of the Highway in Urban Development," TE, Vol. 36, April 1966, pp. 32-36. (1,4,7a).

A general discussion.

582. Midler, Joseph L. "A Stochastic Multi-period Multimode Transportation Model," TS, Vol. 3, February 1969, pp. 8-29. (2a,8).

"Model for selecting an optimal combination of transportation modes over a multiperiod planning horizon."

583. Miklius, Walter. "Some Characteristics of Nonregulated For-Hire Truck Transportation of Agricultural Commodities," LE, Vol. 42, May 1966, pp. 226-229. (8b).

584. Miller, M. "High Speed Ground Transportation Research and Development," HSGTJ, Vol. 1, January 1967, pp. 13-21. (1).

Aspects of research and development associated with improvement of transport systems.

585. Miller, Ronald E. "Capital Costs in Air-Transportation," JOURNAL OF INDUSTRIAL ECONOMICS, Vol. 13, July 1964, pp. 236-249. (8d).

Brief study of air transport economics.

586. Mills, Edwin S. "An Aggregative Model of Resource Allocation in a Metropolitan Area," AER, Vol. 57, May 1967, pp. 197-210. (4).

A quantitative model to "explain the sizes and structures of urban areas."

587. Millward, R. "Road Investment Criteria: A Case Study," JTEP, Vol. 2, November 1968, pp. 183-200. (2a,5b).

Descriptions of "methods used to calculate the economic value of a projected new road" in the U.K.

588. Mirheydar, Dorreh. "Problems of Transportation Routes in Iran," JG, Vol. 60, February 1961, pp. 70-74. (8).

589. Mishan, E. J. "Interpretation of the Benefits of Private Transport," JTEP, Vol. 1, May 1967, pp. 184-189. (2a).

A treatment of the congestion costs of private cars and an argument that congestion "may give rise to misleading demands for investment in road engineering."

590. Mogridge, M.J.H. "The Prediction of Car Ownership," JTEP, Vol. 1, January 1967, pp. 52-74. (2a).

An econometric method for long-term forecasting is presented and compared with other methods.

591. Mohring, Herbert. "Land Values and the Measurement of Highway Benefits," JOURNAL OF POLITICAL ECONOMY, Vol. 69, June 1961, pp. 236-249. (4,7a).

A consideration of travel time and property values in the city.

592. Morison, Ian W. and Walter G. Hansen. "Canberra: Toward a Scheme for Continuous Growth," HRR, No. 229, 1968, pp. 7-20. (4,7a).

Alternate plans for urban subcentralization are examined. It is concluded that arrangement of urban development along corridors of an expressway system will permit urban expansion with a minimum of congestion and provide maximum support for a good public transport system.

593. Morrill, Richard L. and William Garrison. "Projections of Inter-Regional Patterns of Trade in Wheat and Flour," EG, Vol. 36, April 1960, pp. 116-126. (2a,6b).

A spatial price equilibrium model, based on the transportation problem of linear programming, is used to project the wheat and flour flows in the U.S.

594. Morrill, Richard L. MIGRATION AND THE SPREAD AND GROWTH OF URBAN SETTLEMENT. (Lund Studies in Geography, Series B, No. 26) Lund, Sweden: Department of Geography, Royal University of Lund. (2a,4,5).

595. Morrill, Richard L. "The Movement of Persons and the Transportation Problem," QUANTITATIVE GEOGRAPHY PART I: ECONOMIC AND CULTURAL TOPICS. W. L. Garrison and D. F. Marble, editors, Evanston, Illinois: Department of Geography, Northwestern University, 1967, pp. 84-94. (2,6b).

The paper presents a probabilistic adaptation of a normative programming model combining the transportation problem, which assigns goods or persons to regions over a transport network and a simple probability function for error in response. Empirical application of the model is made for movement of patients to physicians in western Pennsylvania.

596. Morrill, Richard L., Robert Earickson, and Philip Rees. "Factors Influencing Distances Traveled to Hospitals," EG, Vol. 46, April 1970, pp. 161-171. (2b,4,6c).

"The rate of use of hospitals declines with distance, or more precisely, with intervening opportunities. Social and economic distinctions according to race and income effectively reduce access to physicians and hospitals for the Negro and for the poor in general."

597. Morris, Robert L. "Evaluating the Requirements for a Downtown Circulation System," HRBB 347, 1962, pp. 211-221. (2a,4).

A general model of a central city circulation system, designed to facilitate pedestrian traffic.

598. Morris, S. S. "South Africa's Approach to Urban Traffic and Freeways," TQ, Vol. 18, April 1964, pp. 202-218. (5c).
A discussion of route development.
599. Morris, S. S. "The Impact of the Motorcar on Urban Evolution," TQ, Vol. 20, July 1966, pp. 419-434. (4,7a).
Emphasis on Capetown, South Africa.
600. Moses, Leon N. "Towards a Theory of Intra-Urban Wage Differentials and Their Influence on Travel Patterns," PRSA, Vol. 9, 1962, pp. 53-64. (2,6).
The primary objective of the paper is to elaborate on an analytical tool, the wage gradient, that may prove as useful as the rent gradient in the study of urban problems. The analysis shows what wage would have to be offered at any given point in order to attract any labor from that or other places in the urban area. Alternatively, the analysis suggests how high the wage rate would have to be in any place in order to attract labor from some particular place.
601. Moses, Leon N. and Harold F. Williamson, Jr. "Value of Time, Choice of Mode, and the Subsidy Issue in Urban Transportation," JOURNAL OF POLITICAL ECONOMY, Vol. 71, June 1963, pp. 247-264. (4).
602. Moses, Leon N. and Harold F. Williamson, Jr. "The Location of Economic Activity in Cities," AER, Vol. 57, May 1967, pp. 211-222. (4,7).
Decentralization of the cities results from firm relocation, transportation, and satellite area development.
603. Mosher, Walter W., Jr. "A Capacity-Restraint Algorithm for Assigning Flow to a Transport Network," HRR, No. 6, 1963, pp. 41-70. (2a,5,6).
An algorithm permitting the evaluation of network performances is described. Network loadings are governed by individually determined link functions. For road networks optimum performance functions for the entire network can be established by equalizing path figures for appropriate sets of paths.
604. Mossman, Frank H. "A Conceptual Framework for the Logistics of Distribution Systems," TRANSPORTATION JOURNAL, Vol. 1, Summer 1962, pp. 23-29. (1).

605. Muckleston, Keith W. and Fred E. Dohrs. "The Relative Importance of Transport on the Volga before and after the Communist Revolution," PG, Vol. 17, March 1965, pp. 22-25. (8c).

In reply to an earlier article, the authors contend that the Volga was a truly significant transport route prior to the revolution and its role has steadily diminished since that time.

606. Mundell, R. A. "The Pure Theory of International Trade," AER, Vol. 50, March 1960, pp. 67-110. (2,6a).
607. Munro, John M. "Planning the Appalachian Development Highway System: Some Critical Questions," LE, Vol. 45, May 1969, pp. 149-161. (5b,7a).

The inability of transportation investment to initiate economic redevelopment and the lack of careful planning are major criticisms of the federal government's highway scheme.

608. Muranyi, Thomas. "Estimating Traffic Volumes by Systematic Sampling," HRBB 281, 1961, pp. 16-47. (2a,6).

Using Swiss data and probability theory, Muranyi presents a model for prediction of an entire country's annual average daily traffic and the duration and peak values of critical hours.

609. Muranyi, Thomas. "A Method of Estimating Traffic Behavior on All Routes in a Metropolitan County," HRR, No. 41, 1963, pp. 61-78. (2a,6).
610. Murdie, Robert A. "Cultural Differences in Consumer Travel," EG, Vol. 41, July 1965, pp. 211-233. (2a,6).

A comparison of travel patterns of Old Order Mennonites and "modern" Canadians yields between group differences which suggest socio-economic influences on relative mobility.

611. Murphy, Rhoads. "China's Transport Problem and Communist Planning," EG, Vol. 32, January 1956, pp. 17-28. (1,8).

A discussion of the proposition that extension of transport facilities are the solution to China's economic problems. All forms of carriers and the strategy and motives of government planning are considered.

612. Myers, Sumner. "Personal Transportation for the Poor,"
TQ, Vol. 24, April 1970, pp. 191-206. (4).

The author suggests providing automobile transportation and taxi-bus service to low-income areas to increase the mobility of the inhabitants.

613. Nader, G. A. "Socio-Economic Status and Consumer Behavior,"
US, Vol. 6, June 1969, pp. 235-245. (2b,4,6c).

Type of house is used as a variable describing consumer behavior and socio-economic status.

614. Nash, Allan N. and Stanley J. Hille. "Public Attitudes toward Transport Modes: A Summary of Two Pilot Studies,"
HRR, No. 233, 1968, pp. 33-46. (8).

Consumer attitudes towards existing road systems and attitudes of an ideal transportation system are surveyed.

615. Nash, William W. and Jerrold R. Voss. "Analyzing the Socio-Economic Impacts of Urban Highways," HRBB 268,
1960, pp. 80-94. (4,7a).

616. Naughton, P. W. "Container Transport--The Shipping Viewpoint," ITJ, Vol. 32, November 1967, pp. 273-277. (1).

617. Neal, A. F. "Passenger Transport in Conurbations," ITJ,
Vol. 31, November 1965, pp. 234-241. (4).

A review of the types of urban transport, rail and road, and of the requirements of a good transport system.

618. Neidercorn, J. H. and B. V. Bechdolt, Jr. "An Economic Derivation of the 'Gravity Law' of Spatial Interaction," JRS, Vol. 9, August 1969, pp. 273-282. (2b,6).

An attempt to derive the "gravity law" of spatial interaction from the principle of utility maximization.

619. Nelson, J. G. "Pre-European Trade between Australia, Indonesia and the Asiatic Mainlands," CG, Vol. 5,
Winter 1961, pp. 18-22. (3,6a).

Although existing evidence suggests this trade, the duration and intensity of the trading is still unresolved.

620. Nelson, James C. "Effects of Public Regulation on Railroad Performance," AER, Vol. 50, May 1960, pp. 495-505. (8a).
621. Nelson, James R. "Transport Policy for European Economic Intergration," AER, Vol. 58, May 1968, pp. 378-392. (1,8).

A wide ranging discussion of EEC transport policy, emphasizing the policy for Rhine traffic.

622. Nelson, Robert A. "Railroad Mergers and Public Policy," LE, Vol. 41, May 1965, pp. 183-192. (8a).

Article describes the need for mergers.

623. Nemhauser, G. L. "Scheduling Local and Express Service," TS, Vol. 3, May 1969, pp. 164-175. (2,8).

624. Neutze, G. M. "Major Determinant of Location Patterns," LE, Vol. 43, May 1967, pp. 227-232. (1,7).

A brief treatment of location theory.

625. Newton, Milton B. "Route Geography and the Routes of St. Helena Parish, Louisiana," AAAG, Vol. 60, January 1970, pp. 134-152. (3).

Historical treatment of routes as a cultural feature on the landscape.

626. Nicholson, John. "Some Shipping Problems," ITJ, Vol. 31, July 1965, pp. 159-165. (8c).

A brief generalized summary of problems in the shipping trade and some answers to them.

627. Niedercorn, John H. and John F. Kain. "Suburbanization of Employment and Population: 1948-1975," HRR, No. 38, 1963, pp. 25-39. (2a,7).

An econometric model is presented to explain population and employment changes in central cities and metropolitan rings from 1954-1958. Land use patterns for a typical metropolitan area are predicted for the year 1965 and 1975. Despite decentralizing forces, it is predicted that employment in the central cities will increase faster than population growth in central cities.

628. Nikol'skiy, I. V. "The Geography of Transportation of Kazakhstan," SGRT, Vol. 2, March 1961, pp. 44-54. (6b,8a).

Survey of freight flows, transport facilities and linkages of a part of central Asia.

629. Nikol'skiy, I. V. "Railroad Freight Traffic of the U.S.S.R.," SGRT, Vol. 2, June 1961, pp. 39-93. (6b,8a).

Based on a book on transportation geography of U.S.S.R., presenting data and numerous maps.
630. Nolen, John, Jr. "Defining 'Intercity' for Transportation Purposes," HRR, No. 82, 1965, pp. 109-113. (4).
631. Nordbeck, Stig. "Computing Distances in Road Nets," PRSA, Vol. 12, 1964, pp. 207-220. (2,5).

"Swedish experiments to locate census data in a national grid-system . . . provide the background for work described here: measuring distance by computer."
632. Norman, N. E. "Transport Developments in East Africa, 1965," ITJ, Vol. 31, March 1966, pp. 327-329. (1,8).

A brief review of existing transport services.
633. Normann, O. K. "Variations in Flow at Intersections as Related to Size of City, Type of Facility and Capacity Utilization," HRBB 352, 1962, pp. 55-99. (2a,4,7c).

Efficiency of traffic movement and the influence of several factors on traffic flow.
634. Nystuen, John O. "A Theory and Simulation of Intraurban Travel," QUANTITATIVE GEOGRAPHY PART I: ECONOMIC AND CULTURAL TOPICS. W. L. Garrison and D. F. Marble, editors, Evanston, Illinois: Department of Geography, Northwestern University, 1967, pp. 54-83. (2,4,7).

The study describes a geographical theory relating urban travel behavior to the spatial arrangement of urban facilities. Emphasis is on relating multiple-purpose shopping trips by customers to the arrangement of retail stores in centers, but the author considers the general theory presented broad enough to include all types of intraurban travel.
635. O'Brien, Bob R. "The Future Road System of Yellowstone National Park," AAAG, Vol. 56, September 1966, pp. 385-407. (5).

636. O'Conner, A. M. "New Railway Construction and the Pattern of Economic Development in East Africa," TRANSACTIONS: INSTITUTE OF BRITISH GEOGRAPHERS, No. 36, 1965, pp. 21-30. (7b,8a).

Railway construction has not stimulated economic development in areas of peasant agriculture already served by roads. Railway construction must be considered only part of an integrated economic development program.

637. O'Dell, Andrew C. "Transport of Aberdeen," SCOTTISH GEOGRAPHICAL MAGAZINE, Vol. 79, 1963, pp. 108-113. (4).

Description of the various transport facilities of Aberdeen, including port, rail, road, canal, and air services.

638. Oi, Walter Y. and Paul W. Shuldiner. AN ANALYSIS OF URBAN TRAVEL DEMANDS, Evanston, Illinois: Transportation Center, Northwestern University, 1962. (1,4,6,9).

The purpose of this study is to gain an understanding of the phenomenon of urban travel behavior. Part of the text provides a critical evaluation of origin-destination studies and another portion provides an alternative methodology to the usual treatment of O-D data. Finally, attention is turned to the importance of travel and transportation as it is revealed in the expenditure patterns of urban families.

639. Ojo, G. J. Afolabi. "Some Observations on Journey to Agricultural Work in Yorubaland, S. W. Nigeria," EG, Vol. 46, July 1970, pp. 459-471. (6).

Treats "the characteristic features of journey to work noticeable in areas whose economies are still dominated by primary production."

640. Okondo, P. J. Habenga. "The Relation between Education and Transportation in East Africa," TRANSPORTATION JOURNAL, Vol. 4, Summer 1965, pp. 14-20. (1,3).

Historical look at trade, transportation, and education.

641. Oliver, Robert M. and Leonard Newman. "Effect of Trucks on Freeway Flows," HRR, No. 15, 1963, pp. 67-72. (7).

As slow moving vehicles may block passing attempts on multiple lane freeways, the formation and dissipation of queues are mathematically described as a function of traffic velocity, traffic density, and passing inertia.

642. Olson, Philip. "Theoretical Orientations and Highway Impact Studies," TQ, Vol. 16, November 1962, pp. 521-530. (2,7a).

The paper suggests a guide for planning locations of future highways through the incorporation of existing theory and new conceptualization into highway-related research by using community study techniques.

643. Olsson, Gunnar. DISTANCE AND HUMAN INTERACTION: A REVIEW AND BIBLIOGRAPHY. Philadelphia, Pennsylvania: Regional Science Research Institute, 1965. (1,2,6).

This study broadly reviews and comments upon the literature in which the distance variable in spatial interaction has been treated. The first chapter comments on the role of distance in the existing location theories. The second chapter has as its focus migration and general diffusion models, while the third penetrates more deeply into problems connected with the use of gravity and potential models.

644. Olsson, Gunnar. "Explanation, Prediction, and Meaning Variance: An Assessment of Distance, Interacting Models," EG, Vol. 46, June 1970, pp. 223-231. (2b).

This paper treats definition of the terms explanation and prediction, especially with regard to interaction, along with remarks about statistical inference, meaning variance, and connectability of spatial theories.

645. Olsson, Rune. "Commodity Flows and Regional Interdependence," PRSA, Vol. 12, 1964, pp. 225-230. (2,5,6).

A presentation of examples of maps and tables from surveys made in connection with planning of transportation routes in Sweden and the analytic methods used in such studies. Results of the commodity flow studies are regarded as signs of the ability to produce transport in different kinds of regions and economic units and can be used both in input-output studies and in traffic planning.

646. Orford, K. J. "The Future of the Bus," ITJ, Vol. 31, November 1965, pp. 242-247. (8b).

A discussion of bus service, bus verses car, and the future of the bus.

647. Orr, Earle W. "A Synthesis of Theories of Location of Transport Rates and of Spatial Price Equilibrium," PRSA, Vol. 3, p. 61. (2).

648. Osborn, H. E. "Road Haulage and Roads," ITJ, Vol. 31, July 1966, pp. 417-438. (8b).

An overview of the subject, including many tables.

649. Owen, Wilfred. "Transportation and Technology," AER, Vol. 52, May 1962, pp. 405-413. (1,7).

An article dealing with the cost of transport, plans for the development of transportation, and the potential of future technology.

650. Owen, Wilfred. STRATEGY FOR MOBILITY. Washington, D.C.: The Brookings Institution, 1964. (1,7b).

The text is designed to guide the allocation of resources in emerging economies and in foreign assistance programs, to uncover the possibilities that science and technology offer for the solution of transport problems, to develop criteria for judging the economic potential of transport investments, and to determine effective means of implementing transport programs.

651. Owen, Wilfred. "Road Transportation and Food Production," HRR, No. 125, 1966, pp. 1-10. (1,7b).

Owen analyzes the transportation aspects of the food problem using a broad systems approach that utilizes both transportation and non-transportation investments.

652. Paleyev, Yu. N. "Transport Problems of the Volga Region in Connection with Development of its Productive Forces," SGRT, February 1967, pp. 117-125. (7b).

653. Pappas, P. "Trip Lengths in Relations to Facilities and Journey to Work," EKISTICS, Vol. 30, August 1970, pp. 87-97. (2,4).

"Discusses the distribution of trips by the distances they cover from the home . . . and examines certain relationships between trip lengths and such basic variables as income, density, and distance."

654. Patmore, J. Allan and B. Litt. "The Railway Network of Merseyside," TRANSACTIONS: INSTITUTE OF BRITISH GEOGRAPHERS, No. 29, 1961, pp. 231-244. (5c,8a).

A consideration of the forces that have resulted in the evolution of the rail network, indicating the effects of competition between individual companies on network evolution.

655. Patmore, J. Allan. "The Changing Network of British Railways," G, Vol. 47, November 1962, pp. 401-405. (5c,6,8a).
Description of passenger and freight flow maps and future changes in Britain's rail network.
656. Patmore, J. Allan. "The Railway Network of the Manchester Conurbation," TRANSACTIONS: INSTITUTE OF BRITISH GEOGRAPHERS, No. 34, 1964, pp. 159-173. (5c,8a).
Factors of site and situation and their influence on network evolution.
657. Patmore, J. Allan. "The British Railway Network in the Beeching Era," EG, Vol. 41, January 1965, pp. 71-81. (5b,5c,8a).
Examines the expected railroad network changes resulting from implementation of the Beeching Report. The article considers the effects of closures, the role of rural branches, altered traffic flows, and the competitive duplication of the future network.
658. Patterson, J. H. "50 Years of the Bern-Lötschberg-Simplon Railway," G, Vol. 48, November 1963, pp. 404-406. (3,5b).
Discussion of major resources for the construction of the railway and speculations about its future.
659. Pattison, Irma E. "Roads in Canada," TE, Vol. 33, August 1963, pp. 11-15. (3,5).
Descriptive treatment with historical emphasis on routes.
660. Pattison, William D. "The Pacific Railroad Rediscovered," GR, Vol. 52, January 1962, pp. 25-36. (3,5,8a).
Pattison describes the building of the Pacific railroad and presents re-discovered photographs of the construction.
661. Patton, Donald J. "The Traffic Patterns on American Inland Waterways," EG, Vol. 32, January 1956, pp. 29-37. (6b,8c).
A summary of traffic density patterns for all ports on the inland waterway system, comments on general traffic features, and problems of traffic density.
662. Patton, Donald J. "General Cargo Hinterlands of New York, Philadelphia, Baltimore, and New Orleans," AAAAG, Vol. 48, December 1958, pp. 436-455. (6b,7c).
Origin and destination maps of each city's port hinterlands and factors contributing to the formation of these patterns.

663. Patton, Donald J. "Railroad Rate Structures, Ocean Trade Routes and the Hinterland Relation of Halifax and St. John," TESC, Vol. 52, January 1961, pp. 2-13. (7c,8a).
664. Pavlenko, V. F. "The Transport-Geography Situation and Inter-Regional Links of Central Asia," SGRT, Vol. 4, November 1963, pp. 27-33. (6b,8a).

Treatment of inter-regional movement by commodities and economic regions.

665. Payne, Norman J. "Ground Transportation at Major European Airports," HRR, No. 234, 1968, pp. 18-28. (4).

Discussion of the increasing congestion of airport terminal facilities and the decreasing levels of surface accessibility to terminals.

666. Pegrum, Dudley F. "The Los Angeles Metropolitan Transit Authority," LE, Vol. 37, August 1961, pp. 247-255. (4).

Study of its history, function, and structure.

667. Pendleton, William C. "Land Use at Freeway Interchanges," TQ, Vol. 15, July 1961, pp. 535-546. (7a).

Problems of traffic and land use and suggestions for additional research.

668. Pendleton, William C. "Relation of Highway Accessibility to Urban Real Estate Values," HRR, No. 16, 1963, pp. 14-23. (6c,7a).

House prices, job accessibility, and driving time and distance to the CBD are used to relate O-D data to data concerning the urban housing market.

669. Pendleton, William C. "An Empirical Study of Changes in Land Use at Freeway Interchanges," TQ, Vol. 19, January 1965, pp. 89-100. (2a,7a,9).

"This paper discusses the use of aerial photographs in assembling data on changes in land use, . . . presents the findings from a study of land development around sixty-four freeway interchanges," and suggests a simple model to explain observed rates of change.

670. Penfold, Anthony. "Caracas: Urban Growth and Transportation," TPR, Vol. 41, April 1970, pp. 103-120. (3,4).

Historical survey.

671. Penrose, E. F. "The Place of Transport in Economic and Political Geography," *TRANSPORT AND COMMUNICATIONS REVIEW*, Vol. 5, 1952, pp. 1-8. (1).
672. Perazich, George and Leonard L. Fischman. "Methodology for Evaluating Costs and Benefits of Alternative Urban Transportation Systems," *HRR*, No. 148, 1966, pp. 59-71. (8).
673. Perkins, Dudley. "The Problems Facing the Port of London Authority in the Light of the Devlin Report," *ITJ*, Vol. 31, March 1966, pp. 314-321. (7c).
674. Perle, Eugene D. "Estimation of Transportation Demand," *PRSA*, Vol. 15, 1965, pp. 203-215. (2,8).

The paper attempts to formulate a framework for estimating transportation demand relationships for railroads and motor carriers in the U. S., where interest focuses upon the market behavior of the respective modes during the 1950-1960 interval for manufactured goods. Demand elasticities are empirically derived to explain the pattern of intermodal competition.

675. Pettit, D.E.A. "Retail Distribution Problems," *ITJ*, Vol. 31, September 1966, pp. 470-474. (1,6).
676. Pfister, Richard L. "The Commodity Balance of Trade of the Pacific Northwest for Selected Years, 1929-1955," *PRSA*, Vol. 5, 1959, pp. 237-252. (6).
- The purpose of this paper is to describe and to analyze the commodity trade between the Pacific Northwest and the rest of the world and to examine the position of the Northwest, a region specializing primarily in the production of food and raw materials, relative to other regions of the U.S. which have more highly industrialized and diversified economies.
677. Pieters, L. J. "A Hundred Years of Sea-Communication between England and the Netherlands," *JTH*, Vol. 6, November 1964, pp. 210-221. (3,8c).
678. Pignataro, Louis J. "Urban Transportation, Techniques," *HSGTJ*, Vol. 2, May 1968, pp. 246-259. (1,4).

This general discussion stresses the development of public transportation systems and the factors which may increase acceptance of such systems.

679. Pignataro, Louis J. and John C. Falcocchio. "Transportation Needs for Low Income Families," TQ, Vol. 23, October 1969, pp. 505-527. (4).

Surveys of low-income groups indicate trip generation is significantly below average, and it is suggested that public transportation will provide needed mobility.

680. Pikarsky, Milton. "Comprehensive Planning for the Chicago Crosstown Expressway," HRR, No. 180, 1967, pp. 35-51. (1,5b).

681. Pillsbury, Warren A. "Economics of Highway Location: A Critique of Collateral Effect Analysis," HRR, No. 75, pp. 53-61. (5b).

Pillsbury reviews highway location methodology and evaluates collateral effect analysis in view of the criticisms of those who favor marginal user benefits and costs as a measure of highway efficiency.

682. Pitts, Forrest. "A Graph Theory Approach to Historical Geography," FG, Vol. 17, 1965, pp. 15-20. (2a,3,5a).

Uses graph-theoretic indices to measure to centrality of Moscow.

683. Plowden, S.P.C. "Transportation Studies Examined," JTEP, Vol. 1, January 1967, pp. 5-27. (2a,4).

An overview of predictive methods for urban transport development.

684. Plowman, E. G. "The Transportation Crisis of 1933," TRANSPORTATION JOURNAL, Vol. 1, Fall 1961, pp. 9-14. (1).

Comments on various forms of transportation in 1933.

685. Plowman, E. G. "How Control of Transportation Contributes to Profitability," TRANSPORTATION JOURNAL, Vol. 2, Winter 1962, pp. 13-18. (8).

Common carrier choice.

686. Plummer, Andrew V., Leo G. Wilkie, and Robert F. Gran. "Holiday and Summer Weekend Traffic Survey," HRBB 297, 1961, pp. 74-85. (6).

Compares traffic volumes of recreational and non-recreational trips with respect to time of day, day of travel, and toll road as opposed to non-toll road user destination.

687. Polyakov, Ye. A. "Selection of an Optimal Form of Surface Transportation in the Northeast of the U.S.S.R.," SGRT, Vol. 4, November 1963, pp. 34-42. (5,8a).

Presents factors affecting gauge suitability in areas of high constructing and operating costs.

688. Porter, Philip W. "What is the Point of Minimum Aggregate Travel," AAAAG, Vol. 53, June 1963, pp. 224-232. (2a).

The point of minimum aggregate travel may be determined by least squares analysis. The author describes the method and presents a graphic method for finding the point.

689. Pourcelet, Michel. "The International Element in Air Transport," JOURNAL OF AIR LAW AND COMMERCE, Vol. 33, Winter 1967, pp. 75-85. (8d).

The need for and types of international agreements, such as pooling.

690. Pred, Allan. "Toward a Typology of Manufacturing Flows," GR, Vol. 54, January 1964, pp. 65-84. (6).

Examines volume and length of flow characteristics for plants with similar production functions in dissimilar regions and for plants with dissimilar production functions in similar regions. A typology of manufacturing flows is developed for industries oriented to raw-material and fuel, market, and labor and agglomeration economies.

691. Pred, Allan. "The Intrametropolitan Location of American Manufacturing," AAAAG, Vol. 54, June 1964, pp. 165-180. (7).

Urban decentralization and intra-metropolitan locational patterns of selected industrial groups are analyzed and the effect of transportation noted.

692. Proudlove, J. Alan. "A Traffic Plan for London," TPR, Vol. 31, pp. 53-73. (4).

A report of a "long term plan of highway development in the London area."

693. Proudlove, J. Alan. "Traffic in Towns: A Review," TPR, Vol. 34, 1963-64, pp. 253-268. (4).

694. Prybyla, Ian S. "Transportation in Communist China," LE, Vol. 42, August 1966, pp. 268-281. (3,8).

Describes historical growth of railroads, shipping and aviation in China; concludes that progress was the result of totalitarianism which would ignore the human costs involved.

695. Pursifull, L. J. "Jumbo Jet Aircraft and the Impact They Will Have on Transportation," HRR, No. 234, 1968, pp. 1-17. (1,8d).

696. Pushkareo, Boris. "Highway Location as a Problem of Urban and Landscape Design," HRR, No. 23, 1963, pp. 7-18. (5b).

Principles of aesthetic highway location are described. Adherence to topography, respect for man-made geometry, and the provision of a succession of different views are requirements for highway construction that must be balanced with economic considerations.

697. Putman, Stephen H. "Modeling and Evaluating the Indirect Impacts of Alternative Northeast Corridor Transportation Systems," HRR, No. 180, 1967, pp. 81-93. (2a,5,7).

698. Pyers, Clyde E. "Evaluation of Intervening Opportunities Trip Distribution Model," HRR, No. 114, 1966, pp. 71-98. (2b,4,6c).

The author compares travel patterns estimated by the intervening opportunities model with O-D survey data and concludes that the model satisfactorily simulates the survey data.

699. Quandt, Richard E. "Models of Transportation and Optimal Network Construction," JRS, Vol. 2, 1960, pp. 27-46. (5).

700. Quandt, Richard E. and William J. Baumol. "The Demand for Abstract Transport Modes: Theory and Measurement," JRS, Vol. 6, Winter 1966, pp. 13-26. (2b).

A model of an abstract mode travel demand is formulated and tested. The results indicate an abstract mode approach enables the investigation of modal characteristics without specifying the identity of the mode.

701. Quandt, Richard E. and Kan Hua Young. "Cross Sectional Travel Demand Models: Estimates and Tests," JRS, Vol. 9, August 1969, pp. 201-214. (2b).

A variety of potential demand equations are estimated and analyzed using variates of the "abstract mode model."

702. Quarmby, D. A. "Choice of Travel Mode for the Journey to Work: Some Findings," JTEP, Vol. 1, September 1967, pp. 273-314. (2a,4).

A study of modal choice in Leeds, emphasizing travel time and costs.

703. Quinby, Henry D. "Transportation for Super-regions," TQ, Vol. 17, July 1963, pp. 325-340. (7).

The author discusses the evolution and characteristics of predicted super-regions and the transportation facilities that will be required.

704. Quinlan, H. G. "The Changing Role of Sydney in Australia's Air Transport," AUSTRALIAN GEOGRAPHICAL STUDIES, Vol. 1, April 1963, pp. 49-60. (4,8d).

Time table data are used to delimit hinterlands for major Australian cities.

705. Rae, John B. "Financial Problems of the American Aircraft Industry, 1906-1940," BUSINESS HISTORY REVIEW, Vol. 39, 1965, pp. 99-114. (3,8d).

706. Randall, Duncan P. "Wilmington, North Carolina: The Historical Development of a Port City," AAAG, Vol. 58, September 1968, pp. 441-451. (3,7c).

Randall identifies three functional periods reflecting the changing pattern and significance of transport forms and the changing character of the area served by Wilmington.

707. Ray, D. M. "Cultural Differences in Consumer Travel Behavior in Eastern Ontario," CG, Vol. 11, 1967, pp. 143-156. (6).

708. Raymond, S. E. "British Railways--Towards a Solution and a Modern Railway," ITJ, Vol. 31, May 1966, pp. 363-369. (8a).

A brief review of some of the problems of the railroad with new developments and suggestions.

709. Reed, Wallace E. "Indirect Connectivity and Hierarchies of Urban Dominance," AAAG, Vol. 60, December 1970, pp. 770-785. (2a,5a,8d).

A method of determining dominance is applied to Indian air traffic flows.

710. Reeves, F. A. "New Zealand's Overseas Air Policy and its National and Economic Value," ITJ, Vol. 31, September 1965, pp. 200-206. (1,8d).
711. Reynolds, D. J. "The Economics of Rural Motorways," JOURNAL OF INDUSTRIAL ECONOMICS, Vol. 10, November 1961, pp. 10-20. (8b).
712. Rice, Joseph F. "Adoption of Aerial Survey Methods for Traffic Operations," HRR, No. 19, 1963, pp. 47-52. (9).

Several instances are enumerated which demonstrate the effectiveness of aerial photographic techniques in solving problems associated with traffic flow.

713. Richards, Hoy A. "Transportation Costs and Plant Location: A Review of Principal Theories," TRANSPORTATION JOURNAL, Vol. 2, Winter 1962, pp. 19-24. (7).

A brief summary.

714. Ridley, T. M. "Reducing the Travel Time in a Transport Network," in: A. J. Scott, editor, STUDIES IN REGIONAL SCIENCE, London, England: Pion Ltd., 1969, pp. 73-88. (2,5).

This paper treats the problem in transportation analysis of the allocation of investment to a network and the related problem of the proper scheduling of investments. The author provides a method of solution for the best combination for investment, given an existing network, a number of possible links which can be built or improved, and a fixed budget. A restriction on the general problem of the scheduling of investment.

715. Rimmer, Peter J. "Changes in the Status of Seaports, 1953-1963," NEW ZEALAND GEOGRAPHER, Vol. 21, 1965, pp. 65-72. (7c).

Maps and commentary on New Zealand's seaports.

716. Rimmer, Peter J. "The Problem of Comparing and Classifying Seaports," IG, Vol. 18, 1966, pp. 83-91. (7c).

The paper represents a break from the many detailed studies of individual ports which provide little information regarding an acceptable scale against which the activities or relative importance of any given port can be measured. The paper is, then, a search for such an acceptable measure through review of literature of the measurement of ports and an assessment of the available criteria by analyzing data on New Zealand seaports.

717. Rimmer, Peter J. "A Resurgence in New Zealand Coastal Trade," G, Vol. 51, July 1966, pp. 248-251. (8c).

Credits resurgence of trade to specialized ships with rapid turn around and minimum shore labor.
718. Rimmer, Peter J. "The Search for Spatial Regularities in the Development of Australian Seaports, 1861-1961," GEOGRAFISKA ANNALER, Vol. 49B, 1967, pp. 42-54. (3,7c).

The model of transport development put forth by Taaffe, Morrill, and Gould is modified by weighting links on the transport network and by including a port that survives the historical displacement process. Uses net tonnage figures to indicate port growth.
719. Rimmer, Peter J. "Changes in the Ranking of Australian Seaports, 1951-2 - 1961-2," TEGS, Vol. 58, January-February 1967, pp. 28-38. (7c).
720. Rimmer, Peter J. "The Changing Status of New Zealand Seaports, 1853-1960," AAAG, Vol. 57, March 1967, pp. 88-100. (2a,3,7c).

A verbal model of the evolution of New Zealand's port locations. Vested port interests, the nature of cargo, and actions of the central government are major factors affecting the pattern of port development.
721. Rimmer, Peter J. "Recent Changes in the Status of Seaports in the New Zealand Coastal Trade," EG, Vol. 43, July 1967, pp. 231-243. (7c).

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722. Rimmer, Peter J. "The Transportation Method of Linear Programming, with a New Zealand Example," NEW ZEALAND GEOGRAPHER, Vol. 24, April 1968, pp. 90-99. (2,6).

An introductory explanation, using cement movement as an example.
723. Roberts, John M. et al. "The Small Highway Business of U.S. 30 in Nebraska," EG, Vol. 32, April 1956, pp. 139-152. (7a).

Describes the small highway business complex and its relation to traffic flow.

724. Roberts, Paul O. and David T. Kresga. "Simulation of Transport Policy Alternatives for Colombia," AER, Vol. 58, May 1968, pp. 341-359. (2,7,8).

An explanation of some computer models developed and a description of a "model of the economy and the transportation system of Colombia."

725. Robinson, Carlton C. "Freeways in the Urban Setting," TQ, Vol. 17, July 1963, pp. 432-438. (4).

The article attempts to answer the question: "Will the city become a better place to live as present freeway development continues?" He believes it will.

726. Rodgers, Allan L. "The Port of Genova: External and Internal Relations," AAAG, Vol. 48, December 1958, pp. 319-351. (7c).

Analysis and interpretation of the relationships of the port of Genova to its foreland and hinterland.

727. Roeseler, Wolfgang G. "Traffic Forecasting and the Land-Use Plan," TQ, Vol. 19, July 1965, pp. 396-404. (4).

728. Rogers, Andre. "A Markovian Policy Model of Interregional Migration," PRSA, Vol. 17, 1966, pp. 205-224. (2,6).

A fundamental model of interregional migration is defined which describes current behavior and indicates the distributional consequences of mobility trends. The paper extends the model to include population distribution goals and defines the policy requirements for the achievement of these goals; concludes with a brief consideration of how Markovian models may be used in regional data bank operations and continuously updated information systems.

729. Rom, V. Ya. "The Volga-Baltic Waterway," SGRT, Vol. 11, November 1961, pp. 32-43. (3,6b,8c).

Treatment of history and expected freight changes in the northwestern part of European Russia.

730. Rose, Warren. "Catalyst of an Economy: The Houston Ship Channel," LE, Vol. 43, February 1967, pp. 32-43. (7,8c).

731. Ross, H. Laurence. "Reasons for Moves to and from a Central City Area," SOCIAL FORCES, Vol. 40, March 1962, pp. 261-263. (4).

732. Roth, G. J. and J. M. Thomson. "The Relief of Traffic Congestion by Parking Restrictions," TPR, Vol. 34, 1963-64, pp. 185-198. (4).
- Reasons, methods, implications, and benefits of parking restrictions.
733. Roth, G. J. "An Economic Approach to Traffic Congestion," TPR, Vol. 36, 1965-66, pp. 49-61. (4).
- Describes "a number of concepts commonly used in the field of economics and considers their application to the study of traffic on congested roads."
734. Row, Arthur T. "Transportation in the Center City Development Plan for Philadelphia," HRBB 293, 1961, pp. 45-57. (4).
- A complex of underground railroad connections, an improved subway station, and a major bus garage and parking garage directly connected with the expressway system have increased accessibility to the CBD and has led to a proposed major downtown development project.
735. Ruiter, Earl R. "Improvements in Understanding, Calibrating and Applying the Opportunity Model," HRR, No. 165, 1967, pp. 1-21. (2b).
736. Sackrey, Charles M., Jr. "Overcapacity in the United States International Air Transport Industry," JOURNAL OF AIR LAW AND COMMERCE, Vol. 32, Winter 1966, pp. 24-93. (8d).
- Discussion of the IATA, air agreements, under-utilization and overcapacity of airlines.
737. Salesbury, William and Alan Townsend. "Transportation Studies and British Planning Practice," TPR, Vol. 41, January 1970, pp. 63-79. (1,3).
- A general discussion of transportation planning techniques and the history of transportation planning in Great Britain.
738. Samuelson, P. A. "Spatial Price Equilibrium and Linear Programming," AER, Vol. 42, June 1952, pp. 283-303. (2a,6).
- The use of linear programming changes a purely descriptive problem in non-normative economics into a maximization problem.
739. Savigear, Flavia. "A Quantative Measure of Accessibility," TPR, Vol. 38, 1967-68, pp. 64-72. (2,4,8b).

740. Sawhill, Ray B. and Keith C. Crandall. "Some Measurable Qualities of Traffic Service Influenced by Freeways," HRR, No. 49, 1964, pp. 30-63. (8b).

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741. Scaperlanda, Anthony. "The Role of Transportation in the Economic Integration of Underdeveloped Areas," LE, Vol. 42, May 1966, pp. 205-209. (7b).

"Synthesis of a transportation policy . . . consistent with development goals of economic integration efforts in underdeveloped areas."

742. Schary, Philip. "Competition, Regulation and the Air Freight Industry," JOURNAL OF AIR LAW AND COMMERCE, Vol. 30, Winter 1964, pp. 62-71. (8d).

Competition between all cargo airlines and passenger airlines for air freight.

743. Schary, Philip. "The Civil Aeronautics Board and the All-Cargo Airlines: The Early Years," BUSINESS HISTORY REVIEW, Vol. 41, 1967, pp. 272-284. (3,8d).

744. Schenker, Eric. "Technical Efficiency of British Motor Transport Under Nationalization," TRANSPORTATION JOURNAL, Vol. 4, Spring 1965, pp. 5-11. (8b).

745. Schenker, Eric, and John Wilson. "The Use of Public Mass Transportation in the Major Metropolitan Areas of the United States," LE, Vol. 43, August 1967, pp. 361-367. (4,8).

746. Schimpeler, Charles C. and William L. Grecco. "Systems Evaluation: An Approach Based on Community Structure and Values," HRR, No. 238, 1968, pp. 123-152. (2a,4).

The use of linear programming techniques to formulate an evaluative procedure for transportation systems based on community development criteria and extensions of the procedure in land use planning and other aspects of transportation planning.

747. Schmandt, Henry and G. Ross Stephens. "Public Transportation and the Worker," TQ, Vol. 17, November 1963, pp. 573-583. (4,6).

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748. Schnitt, Robert C. "Population Densities and Automobile Ownership in a Metropolitan Area," JOURNAL OF AMERICAN INSTITUTE OF PLANNERS, Vol. 27, November 1961, pp. 332-333. (2a,4).

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749. Schneider, Morton. "A Direct Approach to Traffic Assignment," HRR, No. 6, 1963, pp. 71-75. (2b,4,6c).

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750. Schneider, Morton. "Direct Estimation of Traffic Volume at a Point," HRR, No. 165, 1967, pp. 108-116. (2a).

751. Schnore, Leo F. "The Use of Public Transportation in Urban Areas," TQ, Vol. 16, November 1962, pp. 488-498. (4,8).

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752. Schofield, G. "The Canalization of the Moselle," G, Vol. 50, April 1965, pp. 161-163. (8c).

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753. Schultz, Gwen M. "Using Dots for Traffic Flow Maps," FG, Vol. 13, January 1961, pp. 18-19. (1,9).

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754. Schwarty, N. L. "Discrete Programs for Moving Known Cargoes from Origins to Destinations on Time at Minimum Bargeline Fleet Cost," IS, Vol. 2, May 1968, pp. 134-145. (2,6).
755. Schwartz, Arthur. "Forecasting Transit Use," HRBB 297, 1961, pp. 18-35. (2a,6).
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756. Schwartz, Arthur. "Sampling Methods for the Collection of Comprehensive Transit Passenger Data," HRR, No. 205, 1967, pp. 86-95. (9).
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757. Schwind, Paul J. "The Geography of Railroad Piggyback Operations," TQ, Vol. 21, April 1967, pp. 237-248. (5,6, 8a).
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758. Scott, Allen J. "A Programming Model of an Integrated Transportation Network," PRSA, Vol. 19, 1967, pp. 215-222. (2,5a).
- The paper considers the problem of how to determine an optimal transportation network linking a given set of settlements. The paper proceeds by justifying the analysis of network structure as a set of binary-coded edge incidences, qualified by the distances between nodes and omitting considerations of capacity. Given a constraint upon the total mileage of the network that can be constructed, this model assumes that the geographical structure of the network should be in some sense optimized.
759. Scott, Peter. "Car Ownership in Australian Cities," TPR, Vol. 31, 1960-61, pp. 125-134. (4).
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760. Scott, Roy V. "American Railroads and Agricultural Extension, 1900-1914: A Study in Railway Developmental Techniques," BUSINESS HISTORY REVIEW, Vol. 39, 1965, pp. 74-98. (3,7,8a).

761. Sealy, Kenneth R. "Road and Rail Transit in Britain," G, Vol. 49, July 1964, pp. 293-303. (8a,8b).

A review of major legislation affecting road and rail transport in Britain from 1921-1962.

762. Sealy, Kenneth R. "The Siting and Development of British Airports," GEOGRAPHICAL JOURNAL, Vol. 133, June 1967, pp. 148-178. (5,8d).

Presents a general discussion of national patterns of airport traffic and airport development in England.

763. Sealy, Kenneth R. THE GEOGRAPHY OF AIR TRANSPORT. Chicago, Illinois: Aldine Publishing Co., 1968. (8d).

The author discusses the physical geography of air transport wherein he details the influence of topography and climate on the location and construction of air terminals and on flying conditions and air routes. He then proceeds to discuss the economic and technical development of air transport, comparing it with other means of transportation. A detailed analysis of world air routes, with a comparison between Europe, the United States, and underdeveloped countries follows, and the book concludes with a section on underdeveloped areas and offers speculations on the future course of air travel.

764. Semple, R. Keith and L. H. Wang. "A Geographical Analysis of Redundancy in Inter-Urban Transportation Links," Discussion Paper No. 5, Toronto, Canada: Department of Geography, University of Toronto, 1970. (2,5a).

The paper analyzes the redundancy of six selected inter-urban highway networks in Canada, which was accomplished by developing a technique using information theory to measure the complexity in networks. A redundancy index was then calculated which related the complexity in bounded real world networks with corresponding bounded ideal networks.

765. Sen, P. K. "Calcutta Traffic Problems," TQ, Vol. 16, April 1962, pp. 289-304. (4).

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766. Seneca, Joseph J. and Charles J. Cicchetti. "A Gravity Model Analysis of the Demand for Public Communication," JRS, Vol. 9, December 1969, pp. 459-470. (2b).

A gravity analysis of telegram service indicates physical distance, rather than economic distance, provides a higher association with volume.

767. Seshagiri, N., R. Narasimhan, S. Mehndiratta, and B. K. Chanda. "Computer Generated Time Tables and Bus Schedules for a Large Bus Transport Network," TS, Vol. 3, February 1969, pp. 69-85. (2,5,8b).

768. Shaner, W. W. "Economic Evaluation of Investments in Agricultural Penetration Roads in Developing Countries," HRR, No. 180, 1967, pp. 120-132. (7b).

Concepts of engineering economy and economic development are used to evaluate penetration.

769. Shanker, K. "Age and Average Trip Length of Trucks in India," TQ, Vol. 20, January 1966, pp. 104-117. (6b,8b).

"The overall average trip length of goods vehicles of various age groups on truck routes under present Indian conditions has been worked out for certain groups of routes classified by effective length of such routes."

770. Sharp, C. J. "The Choice Between Cars and Buses on Urban Roads," JTEP, Vol. 1, January 1967, pp. 104-111. (4).

A discussion of when bus travel is more desirable than auto movement and a suggestion that a balance in mode choice might be planned on the criterion of the total of all journey times.

771. Sherman, Roger. "A Private Ownership Bias in Transit Choice," AER, Vol. 57, December 1967, pp. 1211-1217. (8).

772. Shiatte, Kenneth H. "Composite Networks--A New Planning and Testing Tool," TQ, Vol. 20, January 1966, pp. 113-135. (5c,9).

Describes a computerized method to produce networks requiring less detailed coding and allowing network configurations to be changed without errors.

773. Shuldiner, Paul W. "Trip Generation and the Home," HRBB 347, 1962, pp. 40-59. (2b,4,6c).

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774. Shuldiner, Paul W. "Land Use, Activity and Non-Residential Trip Generation," HRR, No. 141, 1966, pp. 73-88. (2b,4,6c).

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775. Shumate, Robert P. and James R. Dirksen. "A Simulation System for Study of Traffic Flow Behavior," HRR, No. 72, 1964, pp. 19-39. (2b).

A computer simulation system using the language called SIMCAR is described. Only a limited amount of training is needed to use the program which specifies highway geometry, driver and vehicle characteristics, and control elements.

776. Shunk, G. A., W. L. Grecco, and V. L. Anderson. "The Journey to Work: A Singular Basis for Travel Pattern Surveys," HRR, No. 240, 1968, pp. 32-51. (4,6c).

Multiple regression techniques indicate journey-to-work data may be used to predict the links used by total day and all purpose travel.

777. Siddall, William R. "Railroad Gauges and Spatial Interaction," GR, Vol. 59, January 1969, pp. 29-57. (5,8a).

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778. Sielski, Matthew C. "Effect of Northwest Expressway on Alternate Arterial Streets," HRR, No. 21, 1963, pp. 106-126. (6,7a).

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779. Simmons, James W. "Changing Residence in the City: A Review of Intraurban Mobility," GR, Vol. 58, October 1968, pp. 622-651. (2,6c).

This study examines who moves, why they move, and where they move within the city.

780. Simmons, James W. "Interprovincial Interaction Patterns," CG, Vol. 14, 1970, pp. 372-376. (6b).

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781. Sims, J. B. "Freight Rates and Their Break-Even Points," TRANSPORTATION JOURNAL, Vol. 5, Winter 1965, pp. 41-44. (2).

782. Sinclair, Robert. "Von Thünen and Urban Sprawl," AAAG, Vol. 57, March 1967, pp. 72-87. (2a,7).

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783. Singer, Russell E. "The Future Role of the Automobile in Urban Transportation," TQ, Vol. 18, April 1964, pp. 156-168. (1,4).

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784. Slayton, William L. "Urban Renewal and Mass Transportation Planning," TQ, Vol. 16, January 1962, pp. 5-14. (4).

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785. Smeed, R. "The Road Space Required for Traffic in Towns," TPR, Vol. 33, April 1962-63, pp. 279-292. (4).

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786. Smeed, R. "The Effect of Some Kinds of Routing Systems on the Amount of Traffic in the Central Areas of Towns," JOURNAL OF THE INSTITUTE OF HIGHWAY ENGINEERING, Vol. 10, 1963, pp. 5-26. (5,6).

787. Smeed, R. "The Traffic Problem in Towns," TPR, Vol. 35, July 1964-65, pp. 133-158. (4).

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788. Sneed, R. "A Theoretical Model of Computer Traffic in Towns," JOURNAL OF THE INSTITUTE OF MATHEMATICAL APPLICATIONS, Vol. 1, 1965, pp. 208-225. (2a,4).
789. Sneed, R. "Traffic Studies and Urban Congestion," JTEP, Vol. 2, January 1968, pp. 30-70. (4,5,6).
- "A quantitative analysis of capacity and congestion in real and imaginary town centers" and suggested remedies.
790. Smerk, George M. "Demand Considerations in Urban Transportation," TQ, Vol. 18, July 1964, pp. 421-432. (4).
- Comments on the lack of appeal of public transport, price considerations, and quality in urban transport, with final comments on the Seattle Monorail study.
791. Smerk, George M. "Subsidies for Urban Mass Transportation," LE, Vol. 41, February 1965, pp. 62-65. (4,8).
792. Smerk, George M. "The Streetcar: Shaper of American Cities," TQ, Vol. 21, October 1967, pp. 569-584. (3,7).
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793. Smethurst, P. R. "The National Travel Surveys," TPR, Vol. 38, April 1967-68, pp. 43-63. (9).
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794. Smith, Bob L. "Gravity Model Theory Applied to a Small City Using a Small Sample of Origin-Destination Data," HRR, No. 88, 1965, pp. 85-115. (2b,4,6c).
- Using the gravity model and a sample of a longer origin-destination survey of zonal trip production, trip attraction and travel time adequately reproduce the longer O-D survey and may be used for planning purposes.
795. Smith, David A. "Interaction within a Fragmented State: The Example of Hawaii," EG, Vol. 39, July 1963, pp. 234-244. (2b,6b).
- The use of a modified gravity model and simple correlations to measure interaction between Hawaiian cities. The findings indicate the friction of distance is not significantly different from studies using the gravity model in the continental United States.
796. Smith, David A. "Transportation and Terrain in Britain," GR, Vol. 54, July 1964, pp. 431-432. (5).

797. Smith, Frank A. "Relative Role of Highway Transport in the U. S. Economy," HRR, No. 175, 1967, pp. 27-32. (1,8b).
798. Smith, Ian. "The Western Nigeria Road Development Survey: A Case Study in Pre-Investment Analysis in Developing Countries," JTEP, Vol. 2, January 1968, pp. 94-104. (7b).
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800. Smith, Robert H.T. "Transport Competition in Australian Border Areas: The Example of Southern New South Wales," EG, Vol. 39, January 1963, pp. 1-13. (6,8).

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801. Smith, Robert H.T. "Railway Commodity Movement between New South Wales and Victoria," AUSTRALIAN GEOGRAPHER, Vol. 9, 1963, pp. 88-96. (6b,8a).

A paper describing commodity flow prior to the introduction of a standard gauge railway.

802. Smith, Robert H.T. "Toward a Measure of Complementarity," EG, Vol. 40, January 1964, pp. 1-8. (2a,6b).

Uses agricultural commodity flow to the New England states to analyze the notion of complementarity and to measure its relative significance.

803. Smith, Robert H.T. "The Development and Function of Transport Routes in Southern New South Wales, 1860-1930," AUSTRALIAN GEOGRAPHICAL STUDIES, Vol. 2, April 1964, pp. 47-65. (3,5c,8a,8b).

The historical development of roads and railways.

804. Smith, Robert H.T. and Alan M. Hay. "A Theory of the Spatial Structure of Internal Trade in Underdeveloped Countries," GA, Vol. 1, April 1969, pp. 121-135. (2a,6b).

The objectives of this article are to present the theory of internal trade, depict the theory with graphical models, and to test hypotheses derived from the models.

805. Smith, Robert H.T. "Concepts and Methods in Commodity Flow Analysis," EG, Vol. 46, June 1970, pp. 404-416. (2a).

A valuable review of quantitative methods used in commodity flow studies and ways of conceptualizing commodity flow research.

806. Smith, Wilbur S. "Synthesized Travel Desires," TQ, Vol. 16, January 1962, pp. 173-200. (2,4,6c).

By defining the factors which govern urban travel, the author develops an interactance formula to forecast zone to zone movement; the formula is tested by comparing simulated results with those from home interviews and ground count.

807. Smith, Wilbur S. "Research and Worldwide Urban Transportation," HRR, No. 125, 1966, pp. 30-39. (4,9).

Travel patterns within several cities are compared and similarities in the patterns suggest the need for a more complete exchange of transportation planning data and techniques of analysis.

808. Snitzler, James R. and Leslie M. Frink. "Regional Transport Planning in Central America," TQ, Vol. 20, July 1966, pp. 447-464. (7b,9).

Discussion of the initial development of transport planning and data collection.

809. Snock, Robert. "An Iterative Assignment Approach to Capacity Restraint on Arterial Networks," HRBB 347, 1962, pp. 60-66. (2a,5,6).

Snock describes a method for computer assignment in the total process of transportation planning.

810. Snock, Robert. "A Comparative Description of a Capacity-Restrained Traffic Assignment," HRR, No. 6, 1963, pp. 12-40. (2a,5,6).

A step-by-step history of a capacity restraint assignment problem is presented as an illustration of its use in highway planning.

811. Snell, R. R., et al. "Traffic Assignment with a Nonlinear Travel Time Function," TS, Vol. 2, May 1968, pp. 146-159. (2).
812. Snitzler, James R. "Transporting Cattle in Argentina," TRANSPORTATION JOURNAL, Vol. 1, Spring 1962, pp. 23-29. (6).
813. Snyder, David E. "Commercial Passenger Linkage and the Metropolitan Nodality of Montevideo," EG, Vol. 38, April 1962, pp. 95-112. (4,5a,6a).

An analysis of the spatial differences in passenger linkages focusing on the node of Montevideo and a description of the transport network, the hierarchial structure among urban places on the network, and the comparative roles of several carrier types.

814. Soberman, Richard M. "Economic Analysis of Highway Design in Developing Countries," HRR, No. 115, 1966, pp. 44-63. (5b,7b).

A framework for analyzing the choice of technology possible in producing a given output of transportation and for examining the trade-off among capital costs, road-use costs, and road maintenance under varying conditions of unemployment, interest rates, and foreign exchange rates. The study demonstrates the most efficient technology in one country is not the same as in another.

815. Soja, Edward W. "Transaction Flows and National Unity: The Nigerian Case," in Gwendolen M. Carter and Ann Paden, editors, EXPANDING HORIZONS IN AFRICAN STUDIES. Evanston, Illinois: Northwestern University Press, 1969, pp. 321-328. (6).

A discussion of the use of telecommunications data and the applications of an indifference model to transaction flows.

816. Solebury, William and Alan Townsend. "Transportation Studies and British Planning Practice," TPR, Vol. 41, January 1970, pp. 63-79. (1).
817. Soltman, Theodore J. "Effects of Alternate Loading Sequences on Results from Chicago Trip Distribution and Assignment Model," HRR, No. 114, 1966, pp. 122-140. (2b,4,6c).

818. Solomon, R. J. "External Relations of the Port of Hobart, 1804-1961," AUSTRALIAN GEOGRAPHER, Vol. 9, 1963, pp. 43-53. (3,7c).

The port's historical development and hinterland and foreland connections.

819. Sommers, Lawrence M. "Distribution and Significance of the Foreign Trade Ports of Norway," EG, Vol. 36, October 1960, pp. 306-312. (6a,7c).

Coastal trade centers act as principal focal points of production and distribution.

820. Sopher, David E. "Pilgrim Circulation in Gujarat," GR, Vol. 58, July 1968, pp. 392-425. (6b).

A wide-ranging discussion of pilgrim traffic in Hindu holy places, considering the influences of caste, occupation, income, and the nature of the religious center on the spatial pattern of pilgrimages.

821. Squibb, Glenn A. "Tailoring Rates and Service for Market Development," TRANSPORTATION JOURNAL, Vol. 5, Fall 1965, pp. 16-22. (8).

An example using coal transportation by rail and lake vessel.

822. Srinivasan, N. S. "Growing Traffic and Transportation Problems in Indian Cities," TE, Vol. 37, July 1967, pp. 44-48. (4).

823. Stabler, J. C. "Exports and Evolution: The Process of Regional Change," LE, Vol. 44, February 1968, pp. 11-23. (7b).

The article gives an overview of location theory and regional development as they relate to exports.

824. Stairs, Sonia. "Selecting an Optimal Traffic Network," JTEP, Vol. 2, May 1968, pp. 218-231. (2a,5).

Consideration of three network selection problems: optimal methods, heuristic rules, and interactive computing.

825. Stanhagen, William H. "Highway Interchanges and Land-Use Controls," HRBB 288, 1961, pp. 32-60. (7a,8b).

Land use controls as practiced in several states are extensively analyzed and evaluated.

826. Stanley, William R. "Transport Expansion in Liberia," GR, Vol. 60, October 1970, pp. 529-547. (3,5c).

Historical inspection of the development and expansion of the transport network, generally supporting the sequence of transport suggested by Taaffe, Morrill, and Gould.

827. Statler, W. H. and R. A. Blay. "Role of the Rotary Wing in Future Short-Haul Transportation," HSGTJ, Vol. 2, May 1968, pp. 369-387. (6,8d).

A wide-ranging discussion of V/STOL vehicles, considering their potential impact on travel time, and on major regions of the United States with short-haul transportation problems.

828. Stern, Stan. "Traffic Flow Data Acquisition Using Magnetic-Loop Vehicle Detectors," HRR, No. 154, 1967, pp. 38-52. (9).

829. Stokes, Charles J. "The Freight Transport System of Colombia, 1959," EG, Vol. 43, January 1967, pp. 71-90. (8).

The transport system is divided into sub-systems by mode of transport and areal unit. In an examination of attempts by each areal unit to solve its transport problems, recent transport development is shown to be superfluous to integration of the sub-systems.

830. Stowers, Joseph R. and Edmund L. Kanwit. "The Use of Behavioral Surveys in Forecasting Transportation Requirements," HRR, No. 106, 1966, pp. 44-51. (2b,4,6c).

Indicates family characteristics, rather than distance and density variables, should be the major variables studied in trip generation analysis.

831. Stronbon, Donald A. "Highway Planning in Ethiopia," TQ, Vol. 20, January 1966, pp. 147-156. (1,8b).

832. Stroup, Robert H., Louis A. Vargha, and Robert K. Main. "Predicting the Economic Impact of Alternate Interstate Route Locations," HRBB 327, 1962, pp. 67-72. (5b,7a).

The effects of alternate highway routes on the location of highway-oriented business are projected for different business types by community. Changes observed along an existing route are used as the basis for projecting. Comparisons are made on the basis of access, visibility, development potential, advertising restrictions, and anticipated driver behavior.

833. Stroup, Robert H. and Louis A. Vargha. "Economic Impact of Secondary Road Improvements," HRR, No. 16, 1963, pp. 1-13. (7a).

The effects of improved rural roads on the trading patterns of rural residents are examined, indicating that road improvements lead to inter- and intra-county market adjustments, specialization of enterprise, and concentration of business.

834. Sturmev, S. G. "National Shipping Policies," JOURNAL OF INDUSTRIAL ECONOMICS, Vol. 14, November 1965, pp. 14-29. (1,8c).

Rationale, methods, and effects of assisting shipping.

835. Sturmev, S. G. "Economics and International Liner Service," JTEP, Vol. 1, May 1967, pp. 190-203. (8c).

"An examination of the system of conferences to control charges by cargo lines."

836. Sullivan, Sheldon W. and C. E. Pyers. "Results of Use of Pre-Interview Contacts in Pittsburgh," HRBB 297, 1961, pp. 42-51. (4,9).

Pre-interviewing techniques as part of a home-interview origin-destination survey help increase the accuracy of trip recording.

837. Sullivan, Sheldon W. "Variations in Personal Travel Habits by Day of Week," HRR, No. 41, 1963, pp. 39-44. (4,6c).

Due to large variations in traffic volume by day of week, by trip purpose, and mode, it is suggested that O-D studies compensate for these variations in their sampling procedure.

838. Surti, Vasant H. and Edward F. Gervais. "Peak Period Comfort and Service Evaluation of an Urban Freeway and an Alternate Surface Street," HRR, No. 157, 1967, pp. 144-178. (2a,4).

Galvanic skin response equipment is used to measure driver stress on a freeway and a parallel route. At peak periods the freeway generates more stress than the parallel route.

839. Sutton, Robert M. "The Origins of American Land-Grant Railroad Rates," BUSINESS HISTORY REVIEW, Vol. 40, 1966, pp. 66-76. (8a).

840. Sychrava, L. "Some Thoughts on Feasibility Studies Occasioned by the Appraisal of Road Projects in Thailand," JTEP, Vol. 2, September 1968, pp. 332-348. (7a,7b).

Discussion of "the selection and ranking of 124 projects, considering costs and benefits, likely increases in output, and the intangible social changes brought by a road to hitherto isolated villages."

841. Sylven, Erik. "Traffic Forecasting: Concepts and Approaches," PRSA, Vol. 14, 1965, pp. 137-145. (2b,4,6c).

The author briefly outlines and critically reviews the Cross-Fratar method of traffic projections, and then proposes an approach to a dynamic model using data from Gothenburg, Sweden.

842. Taaffe, Edward J. "Air Transportation and United States Urban Distribution," GR, Vol. 46, April 1956, pp. 219-238. (2b,4,6b).

Analysis of the effects of urban size, function, proximity to other cities, and railroad services on the air traffic of United States cities.

843. Taaffe, Edward J. "Some Recent Books on Transportation," AAAG, Vol. 47, March 1957, pp. 100-103. (1).

844. Taaffe, Edward J. "A Map Analysis of United States Airline Competition," JOURNAL OF AIR LAW AND COMMERCE, Vol. 25, 1958, pp. 121-147. (2,8d).

845. Taaffe, Edward J. "Trends in Airline Passenger Traffic: A Geographical Case Study," AAAG, Vol. 49, December 1959, pp. 393-408. (2a,4,5,6b).

A series of maps is examined for evidence of a relationship between air passenger growth rates and characteristics of individual routes. Resort travel, length of haul, and low coach fares all affect passenger traffic.

846. Taaffe, Edward J. "Traffic Flow in Berlin," GR, Vol. 51, April 1961, pp. 305-307. (4,6c).

847. Taaffe, Edward J. "The Urban Hierarchy: An Air Passenger Definition," EG, Vol. 38, January 1962, pp. 1-14. (2b,4,6b).

A comparison of the actual hierarchical pattern of air traffic with a theoretical hierarchy predicted by the gravity model. Air traffic is influenced by the increasing dominance of large centers, regional ties, and intensification of the hierarchical nature of inter-city linkages.

848. Taaffe, Edward J., Barry J. Garner, and Maurice H. Yeates. THE PERIPHERAL JOURNEY TO WORK. Evanston, Illinois: Northwestern University Press, 1963. (2b,4,6c).

Probability models, modified from population and distance variables, are used to simulate commuting to a west suburban part of the Chicago urban area.

849. Taaffe, Edward J. "Pedestrian Conveyors in the United States," GR, Vol. 53, January 1963, pp. 132-133. (4).

850. Taaffe, Edward J., Richard L. Morrill, and Peter R. Gould. "Transport Expansion in Underdeveloped Countries: A Comparative Analysis," GR, Vol. 53, October 1963, pp. 503-529. (2a,5c,7b).

A verbal model of a six phase ideal-typical sequence of transportation development is described with particular reference to Ghana and Nigeria.

851. Taaffe, Robert N. "Transportation and Regional Specialization: The Example of Soviet Central Asia," AAAG, Vol. 52, March 1962, pp. 80-98. (2a,7b,8a).

Discussion of the expansion of rail transportation and its impetus to regional development. Regional specialization is considered a more viable goal for development programs than regional self-sufficiency.

852. Taaffe, Robert N. "Interregional Passenger Movement in the Soviet Union," EAST LAKES GEOGRAPHER, Vol. 3, 1967, pp. 47-79. (2b,6b,8a).

Analysis of passenger flows with particular attention to inter-regional passenger movement. The gravity model is used to predict flows and to analyze flow variations.

853. Tallamy, Bertram D. "The Interstate Highway System," TQ, Vol. 16, January 1962, pp. 95-102. (5,8b).

A prediction of traffic systems in 1975 shows the routes needing expansion.

854. Tan, T. "A Mathematical Model for Commuter Traffic in Satellite Towns," TS, Vol. 1, February 1967, pp. 6-23. (2a,4,6c).

Charts, diagrams, tables, and bibliography.

855. Tanifji, Shozo. "Traffic and Transportation in the Capital Region of Japan," TE, Vol. 36, August 1966, pp. 58-63. (4,5,6).

Discussion and maps of traffic flow, routes, and transport facilities.

856. Thatch, Daymon, Stanley J. Hille, and Terence Brown. "A Plan for the Efficient Use of Washington's Area Airports," JOURNAL OF AIR LAW AND COMMERCE, Vol. 35, Spring 1969, pp. 204-215. (4,8d).

857. Thiel, Floyd I. "Social Effects of Modern Highway Transportation," HRBB 327, 1962, pp. 1-20. (7a).

Discussion of the influence of highway development on mobile and drive-in services, opportunities for employment, and residential characteristics. Public planning should include an examination of social influences of highway development.

858. Thiel, Floyd I. "Highway Interchange Area Development," HRR, No. 96, 1965, pp. 24-25. (8c).

A combination of land use controls utilizing police power and eminent domain and joint planning by state and local officials is recommended for highway interchange development. Review of results of prior interchange studies.

859. Thillainatagan, R. "Traffic Improvements in Madras," TQ, Vol. 18, July 1964, pp. 449-456. (4).

860. Thomas, Benjamin E. "Modern Trans-Saharan Routes," GR, Vol. 42, April 1952, pp. 267-282. (5).

Current air and motor transport routes, indicating the problems associated with desert travel.

861. Thomas, Benjamin E. "The Railways of French North Africa," EG, Vol. 29, April 1953, pp. 95-106. (8a).

While the railroads of Tunisia, Algeria, and Morocco have many similarities, contrasts between them promote differential effects from post World War II truck competition.

862. Thomas, Benjamin E. "Methods and Objectives in Transportation Geography," PG, Vol. 8, July 1956, pp. 2-5. (1).

American methods and objectives in the geography of transportation, both as a specialty and as a part of human geography, are examined to see what limitations they place upon the development of this field. Three major methods are emphasized: (1) the means of transportation, (2) the nature of the goods carried, and (3) the routes followed by the various types of transportation and the resulting patterns on the earth's surface.

863. Thomas, Benjamin E. "Railways and Ports in French West Africa," EG, Vol. 33, January 1957, pp. 1-15. (7b,7c,8a).

Currently the railroads are organized to encourage exports; interior development necessitates a re-organization of the transport structure.

864. Thomas, E. and Frank E. Horton. FURTHER COMMENTS ON THE ANALYSIS OF NON-RESIDENTIAL TRIP GENERATION. Evanston, Illinois: The Transportation Center, Northwestern University, 1966. (2,4).

865. Thomas, E. N. and J. L. Schafer. "Expanded Models of Urban and Transportation Systems," HSGTJ, Vol. 1, May 1967, pp. 154-201. (2a,4).

Presents a model of the urban system and of the urban transportation system, giving emphasis to the social and psychological aspects of urban systems.

866. Thomas, Frank H. THE DENVER AND RIO GRANDE WESTERN RAILROAD: A GEOGRAPHIC ANALYSIS. Evanston, Illinois: Northwestern University Studies in Geography, No. 4, 1960. (8a).

The purpose of this study is to analyze for the year 1956 the relationship between the actual traffic organization of selected commodities and the potential traffic of these commodities in the counties of the Denver and Rio Grande Western Railroad hinterland and to describe with the aid of maps and actual origination and flow patterns of these commodities.

867. Thomas, Frank H. "Some Relationships between a Railroad and Its Region," TEG, Vol. 53, June-July 1962, pp. 155-161. (7,8a).

868. Thomas, Frank H. "Evolution of Railroad Route-to-Route Relationships: A Case Study of the Denver and Rio Grande Western Railroad," JG, Vol. 62, December 1963, pp. 389-396. (7,8a).

Analysis of the functional relationships between a transport system and the region it serves.

869. Thomas, Frank H. "Railroads and Economic Growth in the United States," GR, Vol. 54, October 1964, pp. 579-580. (7b,8a,8c).

Review of two studies questioning the assumption that railroads were a major initiator of economic growth.

870. Thomas, Richard C. "The Effect of One-Way Traffic Operation on Retail Business," TE, Vol. 38, July 1968, pp. 44-48. (7a).

871. Thomas, Thomas C. "Value of Time for Commuting Motorists," HRR, No. 245, 1968, pp. 17-35. (5b,6).

Calculation of travel time savings by estimating coefficients of toll and travel-time variables in route choice models. Investigates a variety of factors affecting route choice.

872. Thompson, Bryan. "Recreational Travel: A Review and Pilot Study," TQ, Vol. 21, October 1967, pp. 527-542. (2b,6b).

Examination of methods used for analysis of recreational travel, including a pilot study of camper flow in Ontario.

873. Tomazinis, Anthony R. "A New Method of Trip Distribution in an Urban Area," HRBB 347, 1962, pp. 77-99. (2b,4,6c).

Simulation of trip interchanges with a model based on probability theory and certain aspects of the gravity model. Tests of the model indicate revision necessary.

874. Tomazinis, Anthony R. and George V. Wickstrom. "Forming a Comprehensive Transportation Flows Model," HRBB 347, 1962, pp. 254-257. (2b,4,6c).

An outline of the structure of a comprehensive model of traffic flow.

875. Tomazinis, Anthony R. "Modal Split Model in the Penn-Jersey Transportation Study Area," HRR, No. 165, 1967, pp. 41-75. (2b,4).

876. Tomazinis, Anthony R. "Objectives and Obstacles in Mass Transit Development," HSGTJ, Vol. 1, September 1967, pp. 364-377. (4).

The Penn-Jersey Transportation Study indicates that the transportation planner must first focus on the goals and objectives that each system must meet, and then surmount the technical obstacles to developing an essentially modern transport system.

877. Tonuma, Koichi. "The Network City," HSGTJ, Vol. 3, May 1969, pp. 203-219. (4).

The prediction of a network city, a single urban complex, in Japan by the end of the 20th century.

878. Treiterer, Joseph and James I. Taylor. "Traffic Flow Investigations by Photogrammetric Techniques," HRR, No. 142, 1966, pp. 1-12. (9).

A method of measuring traffic movement in a way that is appropriate for the testing and validation of present theories of traffic flow. Accurate vehicle trajectories, and corresponding spacing and velocity data are obtained.

879. Treweek, K. H. "Systems Analysis for the Management of North Atlantic Air Traffic over the Next Ten Years," ITJ, Vol. 32, September 1968, pp. 441-449. (5,6a).

Characteristics of traffic flow are analyzed, flight paths are suggested, and the requirements of improved air traffic management are described.

880. Truett, J. B. and A. J. Balek. "On the Need for a Definition of Demand for Transportation," HSGTJ, Vol. 2, September 1968, pp. 576-592. (1).

A definition of demand should include those factors which motivate demand for transportation. An examination of the definitions of demand implied by current estimating and forecasting procedures indicates no comprehensive and adequate definition.

881. Turton, B. J. "The Changing Transport Geography of the East Midlands," EAST MIDLAND GEOGRAPHER, Vol. 4, June 1969, pp. 387-399. (1).

A review of road and rail transport.

882. Udy, Stanley H., Jr. "Occupation, Commuting, and Limited Access Highway Use," HRBB 347, 1962, pp. 100-105. (4,6c).

Occupation differentials of commuters using a limited access highway. Sales, professional, and technical workers predominantly use the expressway.

883. Ullman, Edward L. "The Railroad Pattern of the United States," GR, Vol. 39, April 1949, pp. 242-256. (5b, 6b,8a).

A classic discussion of traffic and route characteristics of American railways.

884. Ullman, Edward L. "Transportation Geography," AMERICAN GEOGRAPHY: INVENTORY AND PROSPECT. Preston James and C. Jones, editors, Syracuse, New York: Syracuse University Press, 1954, pp. 310-332. (1).

The author presents one of the earliest modern articulations emphasizing the integrative role of transportation geography and the basis for interaction among places on the earth.

885. Ullman, Edward L. "The Role of Transportation and the Basis for Interaction," in W. L. Thomas, editor, MAN'S ROLE IN CHANGING THE FACE OF THE EARTH, Chicago, Illinois: University of Chicago Press, 1956, pp. 862-880. (1,2).

Classic methodological statement of transportation and spatial studies.

886. Ullman, Edward L. AMERICAN COMMODITY FLOW. Seattle, Washington: University of Washington Press, 1957. (2,6,8a,8c).

This text contains a description and an interpretation, through text and maps, of railroad and water traffic flows in American domestic and foreign trade.

887. Ullman, Edward L. "Trade Centers and Tributary Areas of the Philippines," GR, Vol. 50, April 1960, pp. 203-218. (4,6b).

A description of trade centers and tributary areas indicates the Philippines distribution most closely approaches Christaller's K=4 arrangement.

888. Van Ballegoyen de Jong, J.P.A. "Rail Transport in the Harbour Area of Rotterdam," ITJ, Vol. 31, July 1965, pp. 174-177. (3,7c,8a).

Very brief post-1945 history of the port with some discussion of the railroads.

889. Van Hoef, Robert F. "State and Local Highway Planning in Michigan," HRBB 293, 1961, pp. 40-44. (8b).

General discussion of the highway planning program.

890. Vance, James E. "The Oregon Trail and Union Pacific Railroad: A Contrast in Purpose," AAAG, Vol. 51, December 1961, pp. 357-379. (8a).

Comparison of motives for travel and the characteristics of the trail and railway.

891. Vance, James E. "Housing the Worker: The Employment Linkage as a Force in Urban Structure," EG, Vol. 42, October 1966, pp. 294-325. (4).

A consideration of general principles of industrial structure, transportation, and the nature of worker housing, including a descriptive model of housing change and industrial growth.

892. Vargha, Louis A. "Highway Bypasses, Natural Barriers and Community Growth in Michigan," HRBB 268, 1960, pp. 29-36. (4,7a).

893. Varlamov, J. S. and N. N. Kazanskiy. "Forecast of Average Length of Haul on Soviet Railroads," SGRT, Vol. 4, September 1963, pp. 19-25. (7b,8a).

Based on analysis of rail bulk freight traffic, it is predicted that the average length of haul will be reduced over the next fifteen years.

894. Varlamov, J. S. "Problems of Transport Development of the West Siberian Plain in Conjunctions with the Formation of a New Economic Complex in its Territory," SGRT, Vol. 10, June 1969, pp. 312-326. (7b,8a).

Railroad development is considered the optimal initial approach to the region's transport needs.

895. Vasilevskiy, L. I. "Basic Research Problems in the Geography of Transportation of Capitalist and Underdeveloped Countries," SGRT, Vol. 4, September 1963, pp. 36-58. (1,2a).

"The author discusses the subject of transport geography, develops formulas to measure the intensity of the geographical division of labor, describes several population-mobility indices and their use as research tools and outlines principles and criteria to be used in mapping the transportation of capitalist and underdeveloped countries."

896. Vickrey, William S. "Pricing in Urban and Suburban Transport," AER, Vol. 53, May 1963, pp. 452-465. (4,6).

The peak and off-peak pricing of automotive transportation: methods, reasons, and the resultant change in movement patterns.

897. Vickrey, William S. "Optimization of Traffic and Facilities," JTEP, Vol. 1, May 1967, pp. 123-136. (2a,4).

Efficiency methods are proposed to improve urban traffic congestion, predicted upon a differential pricing system for using facilities.

898. Vickrey, William S. "Congestion Theory and Transport Investment," AER, Vol. 59, May 1969, pp. 251-260. (2a).

Six types of congestion are identified. User costs of bottleneck congestion are discussed and graduated user tolls are suggested as a method to relieve congestion.

899. Voorhees, Alan M., Charles F. Barnes, Jr., and Francis E. Coleman. "Traffic Patterns and Land-Use Alternatives," HRBB 347, 1962, pp. 1-9. (4,6c).

Discussion of factors that influence trip length and methods of reducing trip length.

900. Voorhees, Alan M., Salvatore J. Bellons, Joseph L. Schafer, and Donald E. Cleveland. "Factors in Work-Trip Lengths," HRR, No. 141, 1966, pp. 24-26. (2a,4,6c).

Authors discuss major factors affecting the length of urban work-trips: Income of trip maker, mode of travel, the peak-hour travel characteristics, and the distribution of employment opportunities.

901. Vorob'yev, A. A. "Problems in the Location of Transportation in the Southern Part of Eastern Siberia," SGRT, Vol. 5, May 1964, pp. 3-12. (5).

Discussion of "future development of a transport net for the Baykol region."

902. Vuchic, Vukan. "The Role of Public Transportation in Hamburg, Germany," TQ, Vol. 18, January 1964, pp. 118-140. (4).

903. Wabe, J. S. "Dispersal of Employment and the Journey to Work: A Case Study," JTEP, Vol. 1, September 1967, pp. 345-361. (4).

Study of a firm's labor force in central London and later after suburbanization.

904. Wachs, Martin. "Relationships between Driver's Attitudes Toward Alternate Routes and Driver and Route Characteristics," HRR, No. 197, 1967, pp. 70-87. (5,6c).

Factor analysis, canonical correlation, and multiple correlation-regression are used. Different attitudes are related to the length of the trip and the importance of amenities. The trip-to-work route is influenced by the ease of access to the destination.

905. Wachs, Martin. "A Survey of Citizens' Opinions of the Effectiveness, Needs, and Techniques of Urban Transportation Planning," HRR, No. 229, 1968, pp. 65-76. (4).

The survey indicates people regard investment in transportation to be valuable and that there is a need for more attention to questions of mass transit. Not much importance is attached to the beautification of transportation facilities and little interest in participation in the planning process is expressed, except where the respondent is directly affected by the proposed facilities. Attitudes and opinions are related to socio-economic characteristics of the respondents.

906. Wagner, F. A., Jr. and Adolf D. May, Jr. "Use of Aerial Photography in Freeway Traffic Operations Studies," HRR, No. 19, 1963, pp. 24-34. (9).

The procedures for conducting aerial photographic density studies and presentation of maps of data and mapping techniques.

907. Waite, Graham G. "Techniques of Land Acquisition for Future Highway Needs," HRR, No. 8, 1963, pp. 60-81. (8b).

The state's power to acquire highway rights-of-way and methods and problems of financing such acquisitions. Problems of acquisition in rural, suburban, urban cities are discussed with reference to specific states.

908. Walker, John R. "Social Status of Head of Household and Trip Generation from Home," HRR, No. 114, 1966, pp. 141-151. (2a,4,6c).

The number of trips generated in a home is positively correlated with social status of the head-of-household, number of cars used by the household, and the number of people in the household.

909. Walker, John R. "Rank Classification: A Procedure for Determining Future Trip Ends," HRR, No. 240, 1968, pp. 88-99. (2a,4,6c).

The use of rank correlation techniques to examine the relationship of several socio-economic variables and several categories of trip purposes.

910. Wallace, William H. "Railroad Traffic Densities and Patterns," AAAG, Vol. 48, December 1958, pp. 352-374. (5,6,8a).

Presentation at the regional and national level of rail traffic density and flow patterns.

911. Wallace, William H. "Freight Traffic Functions of Anglo-American Railroads," AAAG, Vol. 53, September 1963, pp. 312-331. (5,6,8a).

On the basis of freight traffic, railroads are classified as internal traffic, originating traffic, terminating traffic, bridge line, or balanced traffic railways.

912. Wallace, William H. "The Bridge Line: A Distinctive Type of Anglo-American Railroad," EG, Vol. 41, January 1965, pp. 1-38. (6,8a).

Aggregation of "bridge-lines" into eight regional groups and analysis in terms of commodity flow, and percent of internal, originating, terminating, and bridge traffic functions.

913. Walmsley, Mildred M. "The Bygone Electric Interurban Railway System," EG, Vol. 17, May 1965, pp. 1-6. (3,8a).

This paper presents an historical account of the rapid development and decline of the electric interurban railway system in the East and Midwest of the U.S. A discussion is also included of how the interurban promoted the expansion of markets for locally grown produce and opened up the cultural opportunities of the city for rural residents living on or near the right-of-way.

914. Walters, Alan A. "A Development Model of Transport," AER, Vol. 58, May 1968, pp. 360-377. (2a,5b,7a).

Presents a simple model which considers the effects of transport investments on link development.

915. Ward, David. "A Comparative Historical Geography of Street Car Suburbs in Boston, Massachusetts, and Leeds, England: 1850-1920," AAAG, Vol. 59, December 1964, pp. 477-480. (3,4).

The comparison indicates that different conditions and chronologies of urban growth are responsible for dissimilarities in the street car suburbs.

916. Ward, Marion W. "The Distribution of Motor Spirit in New Zealand," *NEW ZEALAND GEOGRAPHER*, Vol. 19, 1963, pp. 126-141. (6).

Treatment of imports, distribution, and significance of petroleum.

917. Ward, Marion W. "Port Swettenham and its Hinterland, 1900-1960," *JOURNAL OF TROPICAL GEOGRAPHY*, Vol. 19, December 1964, pp. 69-78. (7c).

Historical growth of the port and its hinterland, with emphasis on the economic aspects.

918. Ward, Marion W. "Progress in Transport Geography," in Ronald V. Cooke and James H. Johnson, editors, *TRENDS IN GEOGRAPHY: AN INTRODUCTORY SURVEY*. London, England: Pergamon Press, 1969, pp. 164-172. (1,5).

A brief review emphasizing studies of network analysis designed for the teacher and introductory student.

919. Warner, Larkin. "Railroad Rates and the Growth of Coal Trucking in Ohio," *LE*, Vol. 38, August 1962, pp. 231-239. (8a,8b).

920. Warntz, William. "Transportation, Social Physics, and the Law of Refraction," *FG*, Vol. 9, 1957, pp. 2-7. (2,5,6).

921. Warntz, William. "Transatlantic Flights and Pressure Patterns," *GR*, Vol. 51, April 1961, pp. 187-212. (2,5).

A discussion of airline routes indicates the mathematical and graphical techniques used in planning least-time paths for air traffic.

922. Warren, K. "The Sheffield Rail Trade, 1861-1930: An Episode in the Locational History of the British Steel Industry," *TRANSACTIONS: INSTITUTE OF BRITISH GEOGRAPHERS*, No. 34, 1964, pp. 131-157. (3,8a).

An intensive case study linking the characteristics of rail trade to broader changes in the English economy.

923. Watson, J. W. "Geography--A Discipline in Distance," *SCOTTISH GEOGRAPHICAL MAGAZINE*, Vol. 71, 1955, pp. 1-13. (1).

Discussion of the important role of distance, its different measurements and significance.

924. Wattleworth, Joseph A. and William A. McCasland. "Study Techniques for Planning Freeway Surveillance and Control," HRR, No. 99, 1965, pp. 200-223. (5,9).

Entrance ramp origin-destination studies, input-output studies of closed freeway sub-systems, aerial photography, and input-output studies of initial intersections are discussed as aids to planning freeway networks.

925. Watts, H. D. "The Inland Waterways of the United Kingdom in the 1960's," EG, Vol. 43, October 1967, pp. 303-313. (8c).

A general discussion of water transport and waterways on which use is restricted.

926. Weaver, Robert C. "The Federal Interest in Urban Mass Transportation," TQ, Vol. 17, January 1963, pp. 24-32. (4,8).

Federal interest is based on effective land use, health of core cities and their suburbs, the vitality of the CBD, since the shape of urban areas depend upon the transportation structure.

927. Webb, G. R. "The Changing Role of Australian Coastal Shipping," G, Vol. 48, November 1963, pp. 414-417. (6,8c).

Brief discussion of decline in passenger and general cargo traffic and the expansion of bulk cargo traffic.

928. Webber, Melvin M. "Transportation Planning Model," TQ, Vol. 15, July 1961, pp. 373-390. (2a).

Weaknesses of static-descriptive models as contrasted with the advantages of dynamic-behavioral approaches.

929. Wehner, B. "Proposals for the Solution of Traffic Problems in Towns," EKISTICS, Vol. 21, April 1966, pp. 225-229. (4).

930. Weigend, Guido G. "Bordeaux: An Example of Changing Port Functions," GR, Vol. 45, April 1955, pp. 217-243. (7c).

A description of port genesis and functions.

931. Weigend, Guido G. "The Problem of Hinterland and Foreland as Illustrated by the Port of Hamburg," EG, Vol. 32, January 1956, pp. 1-16. (7c).

A discussion of the concepts hinterland and foreland, transportation problems, and port traffic.

932. Weigend, Guido G. "Some Elements in the Study of Port Geography," GR, Vol. 48, April 1958, pp. 185-200. (7c).

The concepts of port, carrier, cargo, hinterland, foreland, and maritime space are analyzed systematically.

933. Weiner, Edward. "Modal Split Revisited," TQ, Vol. 23, January 1969, pp. 5-29. (2b).

Types of transit estimating procedures are discussed, along with recent developments in modal split procedures.

934. Weiner, Melvin M. "Directional Traffic Flow," TQ, Vol. 20, October 1966, pp. 589-615. (2,5,6).

Using topological concepts, unidirectional traffic flow in a road network of arbitrary geometry is determined. "Some of the differences between topological graphs and directional flow graphs are reviewed."

935. Wendt, Paul F. "Influence of Transportation Changes on Urban Land Uses and Values," HRBB 268, 1960, pp. 95-104. (7).

Review of theories of urban land values, with particular reference to the effects of transportation changes on land values. Summary of urban land value trends and new approaches to studies of the influence of transportation on urban land uses and values.

936. Werner, Christian. "The Role of Topology and Geometry in Optimal Network Design," PRSA, Vol. 21, 1968, pp. 173-190. (5a,5b,5c).

This paper evaluates the interrelationship that holds, under idealized conditions, between the spatial design of a network and the joint costs of its construction and operation; and the effects of bundling are studied and used to adjust any given network with regard to its spatial design until the total costs assume a minimum. A major result of the study is the finding that, if flow declines at least linearly with distance, the minimum cost solution is a network of minimum length.

937. Werner, Christian. "The Law of Refraction in Transportation Geography: Its Multivariate Extension," CG, Vol. 12, 1968, pp. 23-40. (5).

Considers a more general form of the problem proposed by Von Stackelburg by dividing a region into any finite number of homogeneous sub-regions. Presents an algorithm which identifies the path of minimum total costs between two point locations and a technique for plotting the path directly from a map showing these cost sub-regions.

938. Werner, Christian. "Networks of Minimum Length," CG, Vol. 13, 1969, pp. 47-69. (5).

Treats the problem of determining network configuration which interconnects a given set of nodes in a homogeneous plane and is of minimum length.

939. Wernstedt, Frederick L. "Cebu: Focus of Philippine Interstate Trade," EG, Vol. 32, October 1956, pp. 336-346. (3,7c).

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940. Whalen, Joseph T. and Thomas H. Flynn. "The Truck Comes First," HRR, No. 217, 1968, pp. 28-40. (8b).

Describes service facilities and recommends more efficient service areas.

941. Whebell, C.F.J. "Corridors: A Theory of Urban Systems," AAAAG, Vol. 59, March 1969, pp. 1-26. (1,3).

Uses Southern Ontario as an illustration of principles of corridor theory, discussed in five stages of development.

942. Wheeler, James O. "The Transportation Model and Changing Home-Work Location," EG, Vol. 19, May 1967, pp. 144-148. (2,4,6c).

The paper presents two applications of the normative transportation model under different spatial structures of home and work. The first traces journey-to-work changes resulting from different locational arrangements of home and work in a hypothetical city. The second, based on Pittsburgh data, measures first the effect of work-trips by modifying residential locations and secondly by modifying only workplace distributions.

943. Wheeler, James O. "Work-Trip Length and the Ghetto," LE, Vol. 44, February 1968, pp. 107-112. (4,6c).

The role of the Negro ghettos in Pittsburgh on Negro travel patterns.

944. Wheeler, James O. "Some Effects of Occupational Status on Work-Trips," JRS, Vol. 9, April 1969, pp. 69-78. (2a, 4,6c).

Multiple correlation and regression are used to examine the relationship between status of traveler and distance traveled.

945. Wheeler, James O. "Transport Inputs and Residential Rent Theory," GA, Vol. 2, January 1970, pp. 43-54. (2,4,6c).

The postulate of residential rent theory that transport inputs vary positively with status holds in general in Tulsa, although work-trips cannot be explained simply by this transport postulate.

946. Wheeler, James O. "The Structure of Metropolitan Work-Trips," PG, Vol. 22, May 1970, pp. 152-158. (2,4,6c).

The linkage-structure of work-trips in Tulsa analyzed by origin and destination zones is described by a small number of independent factors from a factor-analytic solution. The importance of centrality in urban organization is incorporated in several of the factors. The attractive power of destinations seems to increase with an increase in centrality of location and size of labor force employed.

947. Wheeler, P. T. "The Development of Shipping Services to the East Coast of Sutherland," JTH, Vol. 6, November 1963, pp. 110-116. (3,8c).

948. White, H. P. "New Ports in Dahomey and Togo," G, Vol. 46, April 1961, pp. 160-163. (7c).

Report on shipping potential.

949. White, H. P. "The Movement of Export Crops in Nigeria," TEGS, Vol. 54, November 1963, pp. 248-252. (6b).

950. White, H. P. "London's Rail Terminals and Their Suburban Traffic: A Geographic Appraisal of the Commuter Problem," GR, Vol. 54, July 1964, pp. 347-365. (3,4,6c).

Presents a history of commuter traffic and commuting patterns.

951. White, H. P. "The Rapid Transit Revival--A Comparative Review of Overseas Practice," US, Vol. 4, June 1967, pp. 137-148. (8).

Review of technology and finance of rapid transit in North America and Europe.

952. Whiteside, Robert E., C. Larry Cothran, and William M. Kean. "Intercity Traffic Projections," HRR, No. 205, 1967, pp. 110-135. (2,4,6c).

Using O-D for Arizona and Illinois, growth factors are developed to project traffic to 1985 levels.

953. Whittington, G. "The Swaziland Railway," TESS, Vol. 57, March-April 1966, pp. 68-73. (8a).

954. Wiant, Rex H. "A Simplified Method for Forecasting Urban Traffic," HRBB 297, 1961, pp. 128-145. (2b,4,6c).

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955. Widdison, J. G. "Mexico's Transsierran Railroad," GR, Vol. 51, July 1961, pp. 429-430. (8a).

956. Wiens, Harold J. "Riverine and Coastal Junks in China's Commerce," EG, Vol. 31, July 1955, pp. 248-264. (6).

Examines Chinese junk traffic and its centers of activity and evaluates the traffic's regional and national significance to communist China.

957. Williams, Anthony and Wilber Zelinsky. "On Some Patterns in International Tourist Flows," EG, Vol. 46, October 1970, pp. 549-567. (6a).

An attempt to uncover major patterns of flow among selected countries which dominate the international tourist market.

958. Williams, Ernest W., Jr. FREIGHT TRANSPORTATION IN THE SOVIET UNION. Princeton, New Jersey: Princeton University Press, 1962. (1,6,7,8).

This text surveys the structure, growth, and mode of operations of Soviet transportation. The primary objective is to assess Soviet performance in moving freight.

959. Wilson, A. G. "Inter-regional Commodity Flows: Entropy Maximizing Approaches," GA, Vol. 2, July 1970, pp. 255-282. (2,6b).

A whole family of gravity models are derived by applying entropy maximizing principles; inter-regional input-output equations are treated as constants, and "a number of integrated gravity and input-output models are demonstrated."

960. Wilson, George W. "The Nature of Competition in the Motor Transport Industry," LE, Vol. 36, November 1960, pp. 387-391. (8b).

Various opinions on competition and Federal controls.

961. Wilson, George W. "Case Studies of Effect of Roads on Development," HRR, No. 115, 1966, pp. 10-18. (7a).

Specific studies in Latin America and Asia are summarized. Road development is construed to be in response to development already in progress or a partial initiator of development. Increased transportation capacity is not considered a causative agent of development in a relatively static or deteriorating situation.

962. Wilson, George W. "Transportation and Price Stability," AER, Vol. 59, May 1969, pp. 261-269. (1,7).

963. Wingo, Lowden and Harvey S. Perloff. "The Washington Transportation Plan: Technics or Politics," PRSA, Vol. 7, 1961, pp. 249-262. (4).

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964. Wingo, Lowden. TRANSPORTATION AND URBAN LAND. Washington, D.C.: Resources for the Future, Inc., 1964. (2,4,7).

The author presents mathematical models relating accessibility and land use; the study also demonstrates the role of internal transportation in ordering the urban studies.

965. Wise, M. J. "The Impact of a Channel Tunnel on the Planning of South-Eastern England," GEOGRAPHICAL JOURNAL, Vol. 13, June 1965, pp. 167-184. (7).

The channel tunnel appears to reinforce the circumstances that are leading to the growth of the "servicing" industries in London and to increase the economic disequilibrium between the South-east and the North and West.

966. Witheford, David K. "Traffic Assignment Analysis and Evaluation," HRR, No. 6, 1963, pp. 1-11. (2a,4,6c).

Criterion for viable traffic assignment analysis with reference to the Pittsburgh Area Transportation Survey.

967. Wohl, Martin. "Demand, Cost, Price and Capacity Relationships Applied to Travel Forecasting," HRR, No. 38, 1963, pp. 40-54. (2b,6).

Presents a general form of travel forecasting which incorporates feedback mechanisms affecting traffic volume and time and route capacity. Describes price, volume, and demand relationships for fixed and changing capacity systems.

968. Wohl, Martin. "Costs of Urban Transport Systems of Varying Capacity and Service," HRR, No. 64, 1964, pp. 1-70. (2,4,6c).

The cost of services to work-trip commuters is analyzed extensively. Residential collection, line-haul, and downtown distribution costs per passenger trip for principal transport modes associated with urban, radial, CBD-oriented facilities are examined. This analysis demonstrates a framework for conducting cost analyses and using the results for decision making.

969. Wohl, Martin, and Brian V. Martin. "Methods of Evaluating Alternative Road Projects," JTEP, Vol. 1, January 1967, pp. 28-45. (5,7).

A critical evaluation of four methods of road investment: annual cost, benefit-cost ratio, rate-of-return, and net present methods, the latter of which is considered preferable.

970. Wohl, Martin. "Notes on Transient Queuing Behavior, Capacity Restraint Functions, and Their Relationship to Travel Forecasting," PRSA, Vol. 21, 1968, pp. 191-202. (2,4,6).

971. Wolfe, Roy I. "Contributions from Geography to Urban Transportation Research," HRBB 326, 1962, pp. 46-68. (1,4).

Discussion of spatial concepts applicable to urban transportation theory, of central place theory, and of cartographic techniques.

972. Wolfe, Roy I. "Transportation and Politics: The Example of Canada," AAAG, Vol. 52, June 1962, pp. 176-190. (7).

The North-South geographic axis, and the East-West political axis of North America are compared to demonstrate the political-geographic influence affecting the transport systems of Canada and the United States.

973. Wolfe, Roy I. TRANSPORTATION AND POLITICS. Princeton, New Jersey: D. Van Nostrand Co., Inc., 1963. (7).

Where transportation itself is at the center of interest, it is inevitably the economics of transportation that is discussed, with the implication that once this is understood, transportation is understood. In the present text, transportation is the center of interest, but its economic relations enter only when they have political significance. It is the political implications of transportation that are treated in this text.

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975. Wolfe, Roy I. "Effect of Ribbon Development on Traffic Flow," TQ, Vol. 18, January 1964, pp. 105-117. (7a).

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976. Wolfpert, Julian. "The Basis for Stability of Interregional Transactions," GA, Vol. 1, April 1969, pp. 152-180. (2,6b).

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977. Wood, Donald F. "The Distances-Traveled Technique for Measuring Value of Recreation Areas: An Application," LE, Vol. 37, November 1961, pp. 363-369. (6).

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979. Woodward, George A. "The New Italian Autostrade Network," G, January 1963, Vol. 48, pp. 68-70. (5,7).

Outlines progress on construction of this limited access highway system. Speculates on changes in Italian manufacturing which may result.

980. Wootton, H. J. and G. W. Pick. "A Model for Trips Generated by Households," JTEP, Vol. 1, May 1967, pp. 137-153. (2,4,6c).

Presentation of methods of trip volumes and the role of household attributes in the trip generation model.

981. Wright, Paul H. "Traffic, Traffic Generators in the Central Business District," TE, Vol. 35, March 1965, pp. 23-24 and 46. (4,6,7).

Examines land use changes in the CBD and their effect on traffic.

982. Wright, Paul H. "Relationships of Traffic and Floor Space Use in Central Business District," HRR, No. 114, 1966, pp. 152-168. (2,4,6c).

Multiple correlation-regression analysis indicates traffic flow to the CBD is most closely related to floor-space use classifications of retail sales, services, office, and public establishments.

983. Wright, Winthrop R. "Foreign-Owned Railways in Argentina: A Case Study of Economic Nationalism," BUSINESS HISTORY REVIEW, Vol. 71, 1967, pp. 62-93. (8a).

984. Wynn, F. Houston and C. Eric Linder. "Tests of Interactance Formulas Derived from O-D Data," HRBB 253, 1960, pp. 62-85. (2b,4,6c).

An extensive discussion of interactance formulas and their reliability. Test of the formulas indicated their ability to predict the total volume of vehicle miles on selected urban expressways within 10 percent of the actual volume.

985. Wynn, F. Houston. "Who Makes the Trips? Notes on an Exploratory Investigation of One-Worker Households in Chattanooga," HRR, No. 75, 1964, pp. 84-91. (4,6).

Trip characteristics indicates total trips for workers increase as family size and the number of vehicles owned increases. Work-day length is inversely related to the worker's total number of trips.

986. Wynn, F. Houston, and Herbert B. Levinson. "Some Considerations in Appraising Bus Transit Potentials," HRR, No. 197, 1967, pp. 1-24. (4).

An analysis of potential development of bus transit in medium-size urban areas, with reference to population characteristics, land use, and the opportunity to utilize alternated forms of personal transport. The study suggests new concepts in transit are required.

987. Yamada, Masao. "Urban Development and Expressways in Tokyo," HRR, No. 169, 1967, pp. 30-36. (4).

988. Yapa, Lakshman, Mario Polese, and Julian Wolpert. "Interdependence of Commuting, Migration, and Job-Site Selection," EG, Vol. 47, January 1971, pp. 59-72. (2,4,6c).

"Examines the interdependence of residential and employment mobility, both in terms of the micro-analytic mover-stayer decision and the macro problem of national and regional investment allocation criteria."

989. Yaseen, David W. "The British Motorway," TQ, Vol. 19, July 1965, pp. 413-427. (8b).

A description of the inter- and intrastate freeways in Great Britain.

990. Yaseen, David W. "The Interstate Commercial Zone: An Industrial Location Factor," LE, Vol. 42, February 1966, pp. 107-112. (1,7).

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991. Yates, Barbara A. "Railroads and Waterways of Africa," JG, Vol. 60, March 1961, pp. 120-134. (8a,8c).

Examination of rail and water networks emphasizing the lack of an integrated transport complex.

992. Yeates, Maurice. "Hinterland Delimitation: A Distance Minimizing Approach," FG, Vol. 15, January 1963, pp. 7-10. (2).

This paper treats the situation where a researcher wishes to construct hinterlands based upon optimal criteria and to compare the result with "real world" observation.

993. Yeates, Maurice. "A Note Concerning the Development of a Geographic Model of International Trade," GA, Vol. 1, October 1969, pp. 399-403. (2b,6a).

"Demonstrates that the volume of trade between countries can be explained by a modification of the gravity model."

994. Yegrova, V. V. "The Economic Effectiveness of the Construction of Pioneering Railroads in Newly Developed Areas," SGRT, Vol. 5, April 1964, pp. 46-55. (7,8a).

Analysis of "economic benefits derived from the construction of Lena Railroad in terms of savings of transport costs compared with previous transport routes and in terms of the contribution made to the national economy by the development and settlement of the area served by the railroad."

995. Yordon, Wesley J. "Regulation of Intercity Bus Fares: The Problem of Cost Analysis," LE, Vol. 44, May 1968, pp. 245-253. (8b).

The article describes existing practices in the regulation of bus fares, and points out large loopholes which result from this defect.

996. Zabonski, Bogdan. "A Smooth-Flow Street Pattern for Metropolis," PG, Vol. 14, January 1962, pp. 29-33. (4,5,6).

The aim of this paper is to introduce a totally new concept in the design of an optimum urban street grid, and to point out its advantages as a means of facilitating the flow of city traffic.

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Considers commuting distances, market potential, transport situational and communication patterns in measuring advantages and disadvantages of central places.

998. Zaytzen, I. F. "A Territorial Model of Productive Forces," SGRT, Vol. 10, November 1969, pp. 507-522. (6,7).

A territorial model of production is constructed on the basis of regional units and four preliminary models which describe a single product industry, transport flows, a regional unit, and the decision of labor among regional units.

999. Zell, Charles E. "San Francisco-Oakland Bay Bridge Trans-Bay Bus Riders Survey," HRR, No. 114, 1966, pp. 169-182. (4,6c).

The survey indicates changes in employment and residence caused shifts in bus patronage, and the initiation of an exclusive bus lane did not cause a major increase in bus patronage or a reduction in auto traffic on the bridge.

1000. Zwick, Charles J. "The Demand for Transportation Service in a Growing Economy," HRR, No. 2, 1963, pp. 3-5. (7).

Most future economic growth is expected to be rooted in factors outside of the transportation industry. Major influences in future transportation requirements are changing industrial mix, a larger proportion of income spent on amenities, and the purchasing of goods and services that increase the demand for transport facilities.

B. Topical Index

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